THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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COMPUTERWORLD

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IBM revs up 3090s — with a hitch

Lack of advance notice riles users

BY JEAN S. BOZMAN
CW STAFF

A wave of anger rippled through the IBM user community last week as some of IBM's largest and most loyal customers criticized the vendor for failing to tell them in advance about its plans and for limiting field-engineering upgrades to its most powerful line of mainframes.

"The first things I learned about the new products were in the next day's *Wall Street Journal*," said one large Midwestern user who did not wish to be identified. "If IBM can't share information with me about what's coming, then they should be prepared to suffer the consequences."

That remark was echoed by other users, many of them Fortune 100 companies and each of which has invested millions of dollars in large IBM mainframes and associated operating systems software. Many of the users asked not to be identified because of their historically close relationships with IBM. Some of these firms were among the earliest to install the IBM 3090 Models 200 and 400. They learned that their machines would have to be upgraded to higher E models in order to gain the new performance features.

'Frosted'

One MIS manager, who said he expects to upgrade his Model 400 to a Model 600E at a later date, described himself as irked and said, "One of the things that frosted me was that we have a Model 400 on-site, and the only way we can go is up. Going to a 400E would mean 10 million instructions per second. I could really use 10 more MIPS for a little more work over a weekend."

Another major user, whose company has already adopted a multivendor approach and has yet to acquire a 3090 model, said the upgrade strategy presents a fundamental problem to both MIS and IBM.

"Buying IBM is no longer the safe decision," according to the user, who requested anonymity. "This is going to diminish IBM's market position as other compa-

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Rolls out biggest mainframe ever

BY STANLEY GIBSON
CW STAFF

RYE BROOK, N.Y. — IBM last week replaced its 3090 mainframes with a new line of machines, including its most powerful computer ever. But the announcement was clouded by concerns over limited and costly upgrade paths set for current 3090 users.

The 3090E series features performance improvements of up to 15% compared with the current 3090 line. It also features increased expanded storage and, in some cases, doubled main memory.

The company also announced enhancements to its VM operating system (see story page 9) and to the entry-level versions of its 3088 Multisystem Channel Communication Unit and 3800 laser printer. A 4248 line printer version was also unveiled.

Four of the six 3090E models are enhanced versions of existing models, while two — the 3090 Model 600E and Model 300E — are new machines. The Model 600E uses six central processing units, and the Model 300E has three CPUs. Both computers will be available in the third quarter of this year.

IBM said the enhanced 3090s will be shipped in two stages,

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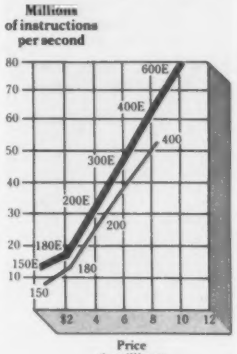
IBM high end
Price/performance of 3090 series



CW CHART: ANN FINN

Group charges foot-dragging on ONA

BY ELISABETH HORWITT
CW STAFF

ORLANDO, Fla. — Telecommunications end-user organizations last week accused the divested Bell operating companies of refusing to collaborate with their customers in efforts to develop and standardize basic service offerings under Open Network Architecture.

At the ONA Forum here, several users groups submitted a memorandum stating that the operating companies had so far refused to provide "any meaningful information on the relevant capabilities of their networks or their ONA plans."

The purpose of ONA is to ensure that AT&T and the operating companies provide consistent basic services using standardized interfaces.

The users group document "addresses the fact that there was a fairly deliberate attempt to delay information exchange [about ONA]," said Kenneth Phillips, vice-president of telecommunication policy at Citicorp and chairman of the Committee of Corporate Telecommunications Users.

Project status

Responding to the memorandum, all seven regional holding companies agreed to provide information on their ONA projects' current status and future plans at the next forum, to be held March 30 through April 2 in San Diego. Phillips suggested the presentations are likely to be "nonsubstantial, but we may be pleasantly surprised."

"We are not withholding information; we are in the process of formulating plans to be submitted to the Federal Communications Commission and trying to gather industry input in the formulation of those plans," a Bell South Corp. spokesman said.

The users organizations' memorandum represents "an unfortunate misconception," according to Southwestern Bell Corp. district staff manager Evelyn Eubank. "It is not as if we have done it all and are not telling. We are still very much in the planning mode," as are all the regional holding companies, she added. The company is also seeking user feedback on an individual basis, she noted.

Several operating company representatives at last week's forum claimed they could not define what basic services they would offer until their users defined their needs. Telenet Communications Corp. responded

Continued on page 102

Bill filed to delay tax change

BY DAVID A. LUDLUM
CW STAFF

WASHINGTON, D.C. — Legislation to delay new tax restrictions on independent computer professionals was filed in Congress last week as controversy continued to swirl around threats to the free-lance status of many contractors.

The bill, which was introduced by Rep. Judd Gregg (R-N.H.), a member of the U.S. House of Representatives' tax-writing Ways and Means Committee, would delay implementation of the changes in the tax law until Dec. 31, 1988.

"We have been inundated with calls from our constituents," said Janet Dearborn, an aide to Gregg. "The purpose [of the bill] is to hold hearings so we

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IN THIS ISSUE

Wiring Mac into the IBM world. Now that Apple's Macintosh has become a fixture in corporate in-house publishing systems, both Apple and third parties are cranking out networking products that will expand the computer's penetration in mainstream office applications. **Pages 4,43**

Cure your users of PC phobia. CW surveyed PC trainers for tips on how to get the most from end users gun-shy around their micros. **Page 61**

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PRODUCT SPOTLIGHT

Managing an SNA network for planned growth and steady service is a complex task. Fortunately, tools have emerged to assist the different mix of network managers in the development and control of this organization resource. By Thomas W. McDonald.

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IN DEPTH

53 For every desk a micro: Price Waterhouse maintains one micro for every three of its employees. By 1990, the firm plans to increase that ratio to one-on-one. By Jean S. Bozman.

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NEWS

CW debuts new look, expanded sections

Nothing endures but change — Heraclitus

This issue of *Computerworld* comes to you with several design changes, all intended to make the paper more readable and, therefore, more informative to our 600,000 readers.

The changes were carefully planned during a three-month period and tested and then fine-tuned through a series of focus groups we hosted for selected readers across the country.

Focus groups showed a strong liking for our front-page index, which we have retained in a more readable form.

Participants in these groups also indicated that color is a very effective way of improving informational graphics.

Thus, we have broken with a 20-year tradition with the color chart you see on page one. We will use color selectively throughout the paper, where it enhances informational graphics or defines a special section inside.

Navigating CW's pages

The index page has been reorganized to make it easier for readers to navigate through *Computerworld* without missing any of the important items or sections within.

Beginning with this issue, product listings formerly compiled in the New Products section have been reorganized into their respective technical sections, which are also sporting a new look.

Today also marks the inaugural run of "Inside Line," CW's "sources said" column featuring snippets of industry scuttlebutt. The column appears on page 102 and will run in the same spot — next to the inside back page — every week.

The design was executed by Ronn Campisi, an award-winning graphic designer based in Boston.

Gillin named exec editor

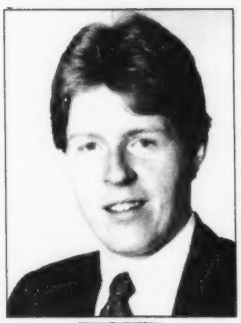
Paul Gillin has been named *Computerworld*'s executive editor, a position in which he will play a major role in the development of both the news and features efforts at the paper.

Gillin comes to CW from *Digital Review*, a Ziff-Davis Publishing Co. publication, where he served as executive news editor.

He was previously a senior editor at Ziff-Davis's *PC Week*, covering both software and micro-mainframe communications.

Gillin is a familiar name to many CW readers. He joined the paper as a staff writer in 1982, and he eventually became the CW senior editor for software, a post he held through January, 1985.

As executive editor, Gillin will play a pivotal role in the development of *Computerworld*'s news coverage, which has been enhanced with an added emphasis on microcomputing and networking news. His background in IBM mainframes, microcomputers and DEC systems brings added balance to the news staff.



Paul Gillin

Along with news director Peter Bartolik, Gillin will work closely with the paper's 20 home-office and bureau reporters.

He will also work with George Harrar, CW's features director, to ensure a unity of purpose between the publication's features and news efforts.

CORRECTIONS

The Product Spotlight chart [CW, Dec. 8] should have included a product from Nichols & Co. in Culver City, Calif., called N5500. The N5500 is an on-line, interactive, full-capacity project management package that is priced from $40,000 to $75,000.

Rutishauser of America, Inc.'s Paperpro 88 cut-sheet feeders [CW, Jan. 19] are priced from $345.

"HP unveils network strategy" [CW Jan. 26] incorrectly identified Keith Smeby's place of employment. He is employed with 3M Corp.

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Network choices confusing

BY PEGGY WATT
CW STAFF

Users trying to cut through the network options tangle for answers say they are finding more questions, especially as Apple Computer, Inc. adds equipment to the communications melee.

"I'm completely confused," said Michael West, data administrator for John Hancock Mutual Life Insurance Co. in Boston, who attended The Seybold Group Conference on Desktop Communications last week.

However, like other conference attendees, West said Apple's demonstration of new connectivity and coexistence in the world of Microsoft Corp. MS-DOS-based systems makes the Macintosh a viable option in office networks.

For example, he originally expected John Hancock's fewer than two dozen Macintoshes to remain separate or on their own network apart from the IBM Personal Computers.

However, after hearing about Apple's promise of IBM 3270 file transfer capability, West said he would take a second look at letting business users crunch numbers on the likes of Microsoft's Excel spreadsheet with figures downloaded from the mainframes.

"I appreciate the way Apple is now allowing MS-DOS file transfer," he said. "I'm in a continued state of wonderment that IBM cannot understand what people need."

A corporate network systems engineer from a West Coast savings and loan institution said he, too, would consider more Macintosh implementations because the cost of networking Apple products is lower than that of IBM PC systems.

Attractive interface

"The cost of PC local-area networks is almost the same as a minicomputer installation but not when it comes to Macintosh networks," he said. The organization uses IBM PCs heavily, but he said the Macintosh interface was attractive to many users and became a viable option with the new connectivity.

"Apple's catching my eye, and that's an incredible surprise," said Patricia M. Taylor, an associate in the data processing center of Washington University in St. Louis, Mo.

"It's good to hear Apple wants to be compatible across the board. That's better than IBM, where we're trying to piece together the strategy," Taylor added.

Apple gives out network keys

Opens door for firms to develop Mac products

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — Apple Computer, Inc. of Cupertino, Calif., last week finally gave third parties the building blocks to develop Appletalk applications and links from Apple into the Microsoft Corp. MS-DOS world.

The Seybold Group's Conference on Desktop Communications set the stage for Apple to unveil a raft of communications products including file server software, protocols and hardware and software that links to IBM Personal Computers and mainframes. At the same time, 31 vendors announced support for Apple's Appletalk File Protocol (AFP) and/or products compatible with Appleshare (see story page 43).

Many analysts and third-party vendors said Apple's approach sets a high-water mark for ease of use and transparency in networking as well as integration of MS-DOS PCs into the Macintosh environment.

For example, a Macintosh user on a network does not have to learn new commands in order to access the file server but can do so simply by using a mouse.

Furthermore, the Appletalk adapter kit costs only $50 and can be installed by most nontechnical users, Apple claimed.

Despite the fact that the network has been limited in features, Apple said it has sold 250,000 Appletalk connector kits (about 50,000 actual networks) since Appletalk was introduced in March 1985.

Among the products Apple unveiled was the Appleshare file server [CW, Jan. 26] — two years after it was announced and 15 months after it was supposed to ship.

"We think you will find it worth the wait," said Apple Vice-President of Product Development Jean-Louis Gassee.

The surprise was that the $799 Appleshare is all software, although it requires a standard Mac with a hard disk to be dedicated as a file server. Since Appleshare is fully integrated into the Mac, using the server volume is like using a local disk. Other features include information security, support for files from multiple operating systems and suppport for up to 25 users, according to Apple.

Also making its long-awaited debut was AFP. AFP represents the presentation layer of the Open Systems Interconnect Reference Model for networks and is thought by some analysts to be more comprehensive than any comparable protocols for PC-based networks.

It provides developers with a well-defined interface for application development. Third-party developers also fear it will force some vendors who have already developed applications for Appletalk to revise.

Among the products Apple introduced last week were:

- The Appletalk PC Card, a half-size add-in card with an intelligent processor that allows DOS-based computers to share information on an Apple network and access Apple's Laserwriter printer. Slated for delivery in the first quarter, it will cost $399.
- The Appleline 3270 File Transfer is a protocol converter that allows users to transfer files between the IBM mainframe environment and the Mac. It is slated for second-quarter availibility and costs $99.
- The Apple Document Content Architecture Filter is a utility that translates documents from popular DOS-based word processing programs to and from Macwrite.

It will be available free of charge as a special release in the second quarter.

3Com announces Mac network for summer

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — 3Com Corp. of Santa Clara, Calif., announced an Apple Computer, Inc. Macintosh-compatible version of its 3+ networking software but said the product would not be available until at least mid-year.

Announced at last week's Seybold Group Conference on Desktop Communications here, 3+ for the Macintosh will eliminate the barrier of network incompatibility separating Macintoshes from office network environments based around systems using Microsoft Corp.'s MS-DOS, 3Com officials claimed.

Joining a host of other third-party vendors, 3Com, along with Centram Systems West, Inc. of Berkeley, Calif., also announced its intent to support Apple's Appletalk Filing Protocol (AFP) in future Macintosh-related products.

3+Macintosh reportedly will transparently integrate Macintoshes and IBM Personal Computers and compatibles on the same network to provide file and printer sharing and electronic mail capabilities, 3Com said.

Macintosh users will also gain naming, backup and modem pooling services, as well as transparent internetwork routing and remote network dial-in, according to the company. Gateway applications such as 3+Reach will provide networked Macintoshes with entry into larger systems.

On the Macintosh side, 3+ supports AFP and Apple's hierarchical file system, allowing Mac users to access Apple and 3Com file servers at the same time. 3Com's 3Server3+ file server features a built-in Appletalk connector.

On the IBM side, 3+ supports the components necessary to networking IBM and compatibles — MS-DOS 3.1 and 3.2, Microsoft's Redirector and IBM's Netbios.

The mail software is compatible with 3Com's 3+Mail, and fully integrates PC and Macintosh users into a common electronic mail system.

"Macintosh network operating software is one of the largest projects at 3Com today," said Robert Bressler, vice-president and general manager of 3Com's application software division.

Borland adds fast compiler; uses RAM

BY PEGGY WATT
CW STAFF

SCOTTS VALLEY, Calif. — Borland International added a fourth language product to its lineup with the introduction last week of Turbo C, a compiler that speeds operations by doing much of its work in memory.

The compiler can use either the Borland programming interface, with pull-down menus and the built-in editor used on the company's other language products, or a standard command line. It includes the Turbo Linker used in Turbo Prolog, which is compatible with Microsoft Corp.'s MS-DOS Linker, and editing windows, according to Brad Silverberg, director of engineering.

Silverberg said Turbo C compiles up to 7,000 lines of code per minute by making a single pass to read the source file on disk and write the object code, using random-access memory for intermediate data structures. Most compilers take four or five passes, each of which is a separate executable action to the disk, he said.

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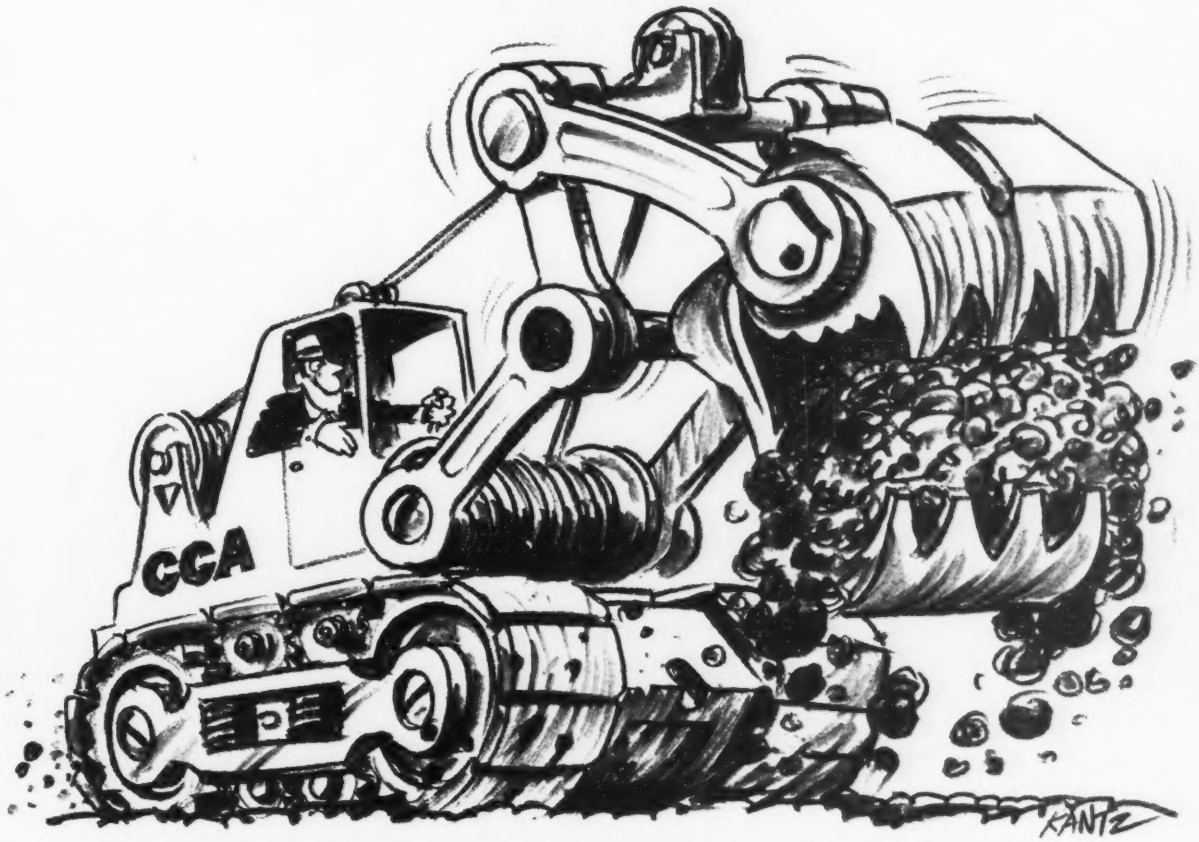

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Full compatible due from Wang

BY DOUGLAS BARNEY
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. is set to unveil a fully IBM Personal Computer AT-compatible microcomputer that corrects the compatibility shortcomings of Wang's current 80286-machine, according to users and analysts. The announcement could come as early as this month.

The Intel Corp. 80286-based machine, expected to be named the PC 280, will be targeted largely at Wang's installed base, sources said. The existing Wang APC is software compatible with the PC AT but does not accept AT expansion boards. Wang declined to comment on the reports.

The PC 280, however, will come with eight fully AT-compatible expansion slots. A version with four slots, dubbed the PC 240, will be released later in the year and will be targeted for use mainly as a terminal with the capability to run IBM compatible software, according to a beta tester of the PC 280.

The 280 will come with a choice of 10-, 20- or 30M-byte hard disk drive and a 1.2M-byte floppy, the beta user said. The processor is software switchable and can run at 6, 8 or 10Mhz.

Like the recently announced Wang Laptop Computer, the PC 280 has two sets of BIOS, a Wang BIOS and an IBM BIOS. In addition, Wang is rewriting much of its software that runs under the Wang BIOS to run under the IBM BIOS.

"The Wang software runs IBM mode, not Wang emulation," a source said. "The Wang BIOS is needed to run other programs that have not been rewritten for the IBM."

A major part of that software strategy involves a new version of VS Plus for the IBM and compatible PCs, which is targeted for release in the spring or summer, sources said.

Sources reported that price has not been set, but Wang planned to price the machine at least 25% less than a comparable IBM system.

Wang is also working on a PC based on the Intel 80386 called the PC 380, and prototypes of the machine have been built. "I don't think you will see it on the market until this fall. There is no reason they couldn't bring it out earlier, but they don't want it to compete with the PC 280," a beta tester said.

According to one source who has seen the PC 280, Wang will OEM the Multisynch monitor from NEC Home Electronics, Inc. In addition, the system will come standard with an Enhanced Graphics Adapter Card from Paradise Systems, Inc., sources reported. Wang may also sell the 21M-byte internal Bernoulli Box from Bernoulli, a source said.

According to a former Wang employee, the firm has had a fully compatible machine for at least a year but has not introduced it because of its desire to reduce inventories of its Wang Professional Computers. Users contacted by *Computerworld* also indicated that the introduction has been delayed in order to preserve sales of existing PCs, as well as to work out technical difficulties with the read-only memory BIOS.

The machines that are in the hands of beta testers are light gray, with the on/off switch located on the front of the box. On the right, the machine has room for three half-height drives, and the middle has room for either one half-height or two full height drives. A speaker is also located on the front of the machine.

Bill filed

FROM PAGE 1

can determine exactly how these people should be treated. There is concern the whole issue needs to be reviewed."

The changes in tax treatment, called for by Section 1706 of last year's tax reform act, were incorported into the act without hearings last June and did not become known to most of the people they affect before Novemeber. The section requires many independent computer programmers, analysts and consultants who regularly work through one broker to become employees of the broker, meaning that taxes must be withheld from their pay and they lose a variety of tax benefits available to independent workers.

On Jan. 21 the Internal Revenue Service issued a clarification of Section 1706, which stated that it does not apply to individuals contracting directly with a client but to subcontractors working through a broker or other intermediary [CW, Jan. 26].

Confusion and acrimony have continued to surround the issue, however, as formerly independent subcontractors accused brokers of financially gouging them, and others debated the implications for those working under direct contracts.

Sandy Bachir, a software quality analyst who worked as a subcontractor at AT&T Corp. in Lincroft, N.J., said she has reluctantly become an employee of her broker. Bachir said that as a result, her take-home pay has been cut by a third from the $6,100 per month she previously earned. She does not receive any benefits and is paying her broker's share of her Social Security tax as well as her own.

"To be forced into an employee-type relationship is one thing but with no benefits and paying the employer's share. . . . I'm not an employee, I'm an outcast," Bachir said. Others face identical situations, she said.

"A lot of brokers are offering independents peanuts — $40,000, down from $90,000," said Joe Scordato, president-elect of the St. Louis-based Independent Computer Consultants Association (ICCA), which wants to repeal Section 1706.

The new law has affected many direct contractors as well because before the IRS issued its clarification its clients terminated their contracts due to uncertainty over the law's impact on the arrangements.

"We're afraid the independents that can remain independents are being affected because of the uncertainty," said Joseph Collins, government affairs manager for the Data Processing Management Association. "A lot of the businesses have been leery and avoiding the independent computer consultants and going to the firms that have those people already designated as employees," Collins said.

Some companies, including Digital Equipment Corp., have continued relationships with independent workers under direct contract.

However, client firms willing to contract directly with independents are "few and far between," ICCA's Scordato said. One major client deals only with seven approved firms, he said. "Even though you meet all the requirements, the clients, being conservative as they are here in New York, back off."

ADAPSO, the computer software and services trade group, which supports Section 1706, and whose members already offer technical services through employees, rather than contractors, issued a statement emphasizing that independent workers might not escape the new law by contracting directly with client organizations.

Jack Dudash, an Ohio independent subcontractor, said he was investigating a class-action lawsuit against large technical service firms that issued statements before the IRS's clarification that said it is nearly impossible for independent workers to remain independent.

"They're essentially putting an interpretation on the law in black and white and sending it out to companies. We understand the law requires further interpretation by the IRS," Dudash said before the IRS clarification.

IBM revs up

FROM PAGE 1

nies provide a better upgrade path."

IBM's two-tier performance strategy, which includes plain-vanilla 3090s and the E series, did not play well to many mainframe users.

It was reminiscent, users said, of a 1984 two-tier scheme concerning the 3083 line — except that the high-performance option was then labeled the X option.

The result was two nonintersecting price/performance curves, and the only way to jump from one line to another was through a costly upgrade.

"To X or not to X," said a user at a large bank. "That really makes me mad." What it means in practical terms is that users who lined up to buy IBM 3090 Model 200s in the $5 million range and wish to upgrade must go to a Model 300E at a cost of $1.6 million or to a Model 400E at a cost of $3.7 million.

But other managers seemed willing to upgrade. The manager of a state government data center, who asked to remain anonymous, said he will likely upgrade his 3090 Model 180 to a Model 200E.

He said he spent about $180,000 per million instructions per second (MIPS) when he purchased the Model 180 and will be paying only about $160,000 per MIPS in upgrading. However, he added, "We still perceive that as too high."

Briefings

Several users were briefed in person by IBM representatives last week. Among them were Mobil Oil Corp. in Dallas, Caterpillar Tractor Co. in Peoria, Ill., and Goodyear Tire and Rubber Co. in Lincoln, Neb.

Some MIS directors who were not briefed last week were beginning to wonder whether there has been a fundamental change in IBM's marketing strategy.

"The thing that's beginning to gnaw at me," one said, "is whether IBM is still the strong marketing organization I grew to respect over the years." Other users, if not angry, were caught off guard by the January announcement. IBM often upgrades its mainframes in February.

'Hoping'

"We were glued to our TV sets during the Superbowl on Sunday, hoping to see a new IBM Personal Computer or something," said Ed McDonald, division manager of information procesing for Texaco, Inc. in Bellaire, Texas.

"Then, on Monday, we were halfway through a planning session when we got a phone call from our marketing rep. All of a sudden, we had a lot of new information in front of us," he said, "and we've been studying the announcement ever since."

McDonald and his staff were clearly impressed by the breadth of the announcement — including a new screen for IBM's laptop micro, the PC Convertible (see story page 8) and a new 3088 channel-to-channel connect that links two 3090s running VM.

"It didn't have everything we wanted, but it all looks like it's taking us in the right direction," McDonald said. "We anticipated a lot of this, but we weren't sure they would be filling in all the performance gaps so quickly."

Rick O'Hara, manager of computer services for A. C. Nielsen Co. in Green Bay, Wis., said he would have liked IBM to announce faster channels with the E models.

Rebuilt Convertible
A better screen and increased memory are added to the IBM laptop. Page 8.

However, he added, "What I really liked about the announcement was that the 600E is not going to take up any more floor space than the 400 does."

Texaco found the new 3090 products, with their higher processing speeds and shorter cycle times, attractive, McDonald added, noting they would help meet the shop's growing needs for capacity.

The Virtual Machine Inter-System Facilities software, coupled with the 3088 channel-to-channel connect, could be an important product for Texaco — and for IBM, McDonald said. "This is a key buiding block that allows you to hook two 3090s together so they can share VM files," he added.

Different needs

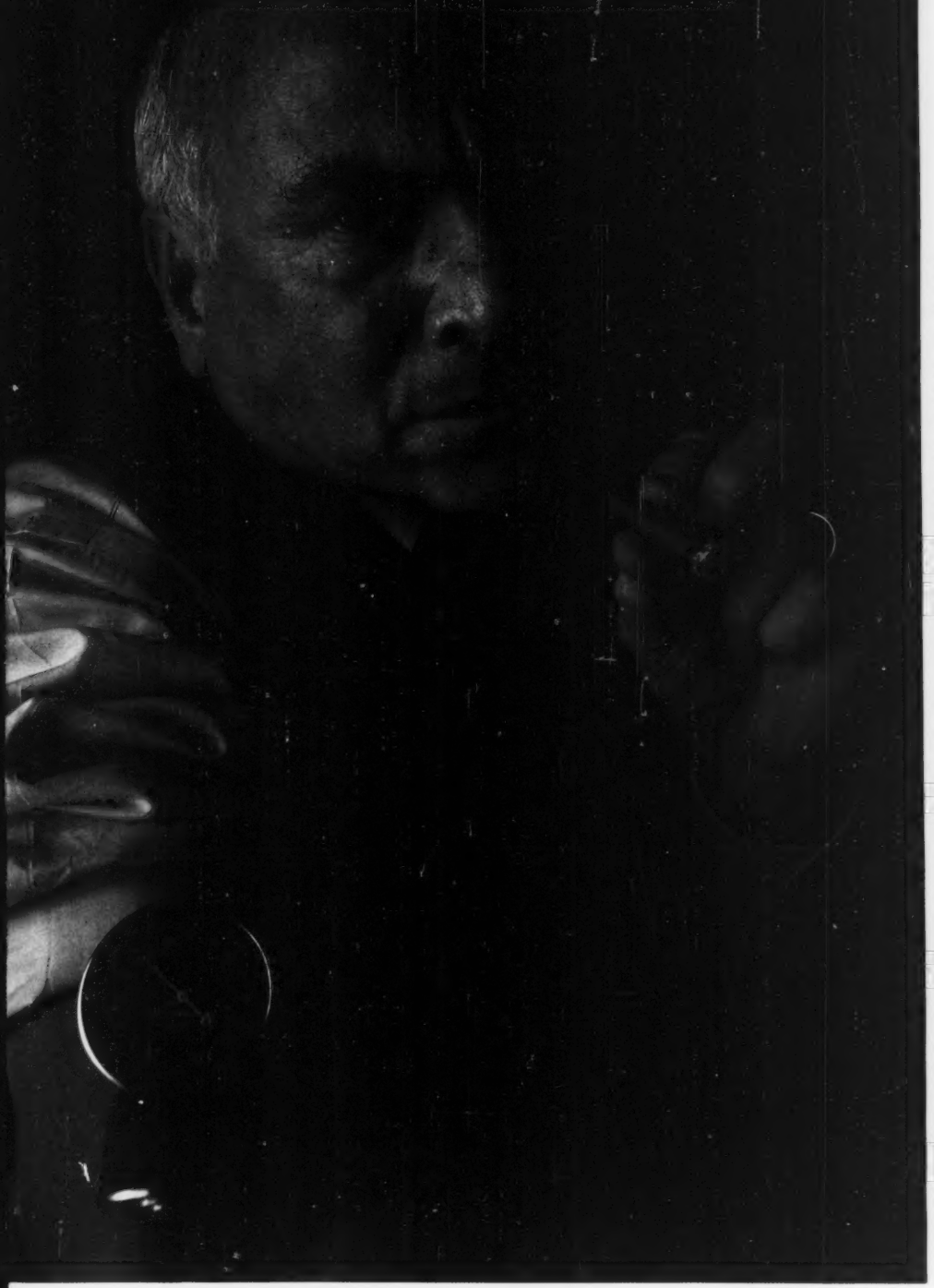
Other shops with different needs said they were not ready to buy just yet but admired many of the new 3090 features. Southland Corp. in Dallas, which has a 3090 Model 200 and recently acquired an Amdahl Corp. 5890, is one such shop.

"We've already built up capacity," said Data Processing Vice-President David Karney, "and we probably have enough horsepower to last us through 1988." But he said he was very interested in the new Model 600 — along with its high-performance features.

"I still don't know if I'll be able to get a field-engineering performance improvement later on," said one 3090 Model 200 user who was unsure of the announcement's implications. "And there's no way of knowing if it will be announced later on."

Staff members James Connolly and Stanley Gibson contributed to this report.

Your Boss's Blood Pressure



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IBM 3090E drives down cost

But used 3080 market still holds back sales

BY JAMES CONNOLLY
CW STAFF

ANALYSIS

IBM drove the cost of large-scale computing down to one of the lowest levels the company has ever offered last week. But the firm known so long for its marketing skills apparently blundered by irritating some of its most loyal customers.

On the positive side, IBM got its point across. Users of 3090s can upgrade to larger and faster models while paying less than they would have for similar moves a month earlier. IBM said an upgrade to one of the larger and more powerful "E" model 3090s translates to a 25% to 28% price/performance enhancement.

In addition, it appears that new customers can realize price/performance advantages ranging from 6% for dual processors to 15.6% for four-way processors when one looks at the price for each million instructions per second (MIPS) of CPU power.

For example, the per-MIPS list price of a 3090 Model 400E — at $136,112 — is 15.6% lower than the comparable price of the older 3090 Model 400. In comparison, the per-MIPS price of much of the previous-generation 3080 mainframe line approached the $300,000 mark several years ago.

But it is the 3080 line that complicates the announcement.

First, the number of 3080s still being purchased on the used market apparently has been one factor in the reported slowness in 3090 sales. Some analysts maintain that the lack of functional difference between the 3080 line and the 3090 line — other than the 3090s' power and use of expanded storage — makes a used 3080 a better buy than a 3090 for some customers.

Analyst Francis Gens of Framingham, Mass.-based market research firm International Data Corp. notes that used 3080s are the second largest factor working against 3090 sales after the general slowdown in capital spending. Gens says the E models' price/performance levels could bring some 3080 users into the 3090 market.

The used 3080s, the shortening of product life cycles, the aggressive pricing of plug-compatible rivals National Advanced Systems Corp. and Amdahl Corp. and the drive by Digital Equipment Corp. into IBM's markets were all factors in forcing IBM to bring out the E models when it did.

The 3090 mid-life kickers came just two years after the family was introduced, while the 3080s were effectively replaced by faster models three years after the 3081s were announced.

The second area in which the 3080s are a factor is in the memory of the IBM customer base. Many 3090 users were disgruntled last week when they learned that they cannot upgrade existing 3090s to equivalent E models (see story page 1). When users asked IBM about upgrades within a model, they were told it was technically impossible.

IBM's answers brought back memories of February 1984, when it announced mid-life kickers for the 3080s. Users were told they could not upgrade to the new 3080X models, which resulted in the older 3080s losing value.

In the case of the 3090s, IBM will allow existing 3090 architecture to be the core for an upgrade. However, several users said last week they would appreciate the opportunity to add about 10 MIPS of power through a weekend lateral upgrade to an E model.

In answer to users' criticism, IBM officials acknowledged that they may have a problem. They suggested they may be able to offer an upgrade solution if they find the problem is serious enough.

Users say laptop upgrade leaves much to be desired

BY DAVID BRIGHT
CW STAFF

MONTVALE, N.J. — IBM last week announced much-needed enhancements to its slow-selling PC Convertible, but users said the laptop system still leaves a lot to be desired.

The enhancements include an improved LCD, which uses "supertwist" technology to produce darker characters; an optional internal modem, which uses either the IBM or Hayes Microcomputer Products, Inc. Attention command set; and an optional 256K-byte memory card, which allows users to increase the maximum random-access memory to 640K bytes.

After introducing the 13-lb PC Convertible last April for $1,995, IBM shipped only 23,000 units in 1986, according to International Data Corp. (IDC), a Framingham, Mass.-based market research firm. Hewlett-Packard Co. shipped 25,000 of its IBM Personal Computer-compatible laptop systems, and Toshiba Ltd. shipped 29,000 units, IDC reported.

"These are things that they should have had in the first place," said Jeff Ehrlich, manager of product technology at General Electric Co., which has hundreds of laptop systems from various makers. Ehrlich says the PC Convertible is still limited by its lack of a hard-disk drive and by its 3½-in. floppy-disk drives.

A hard-disk drive is also a priority at St. Louis, Mo.-based shoe retailer Brown Group, Inc., but the software conversion should not be a problem, said microcomputer consultant Kevin Dopp, because Brown Group has started bringing in IBM Personal Computer XTs with 3½-in floppy disk drives.

> "These are things that [PC Convertible] should have had in the first place."
>
> JEFF EHRLICH
> GENERAL ELECTRIC CO.

Dopp complained about the readability on the earlier PC Convertible and said that not having Attention command set compatibility had prevented the system from being used with a popular file transfer program. "They're starting over from the right point," he noted.

Mainframe

FROM PAGE 1

with customers first receiving processors "equal in performance to the previous 3090 model." Components that add the increased power will not be delivered until after May 1. Current 3090 users who order upgrades will likewise not receive them until after that date. IBM said the time needed to perform the upgrades in the field would range from nine to 24 hours.

However, Big Blue said customers who order an upgraded version before May 1 will save between $25,000 and $125,000. The discount is reportedly applied after a customer negotiates for any previously available discounts. "It's designed so customers can get going before we can ship the new complete processor. It allows us to keep our manufacturing plant going," IBM Vice-President Larry Ford said.

But the field upgrade has some severe restrictions. Customers may not upgrade from a present 3090 model to an enhanced model of the same number: For example, the 3090 Model 150 cannot be upgraded to the Model 150E. Instead, field upgrades change the Model 150 to the Model 180E; the Model 200 to the Model 300E or 400E; and the Model 400 to the Model 600E. Upgrade charges range from $950,000 to $3 million.

"The packaging is such that with the 400, you have to upgrade to the 600E. You can't upgrade to the 400E," Ford said.

Notable in the pricing of the new 3090s is that buying a new E model and upgrading to a higher powered E model is almost always cheaper than buying the higher powered E model initially. The greatest savings — $530,000 — occurs through buying a 180E and upgrading to a 200E. The lone exception is a move up to the 180E.

IBM claimed that current 3090 users can get a 25% to 28% price/performance increase by upgrading. But Francis Gens, an analyst with International Data Corp. a Framingham-Mass. research firm, pointed out that, compared with a Model 200, the increase in price per million instructions per second (MIPS) for a Model 200E is about 10%, a rate fairly typical for a mid-life kicker such as this.

Thomas Henkel, an analyst with the Boston-based Yankee Group, said that although, technically, there is no apparent reason why an existing model cannot be upgraded to an E model of the same number, IBM does not want to upgrade in that manner because it does not believe it could offer the upgrade at a cost attractive to the user. "But I'll bet anything that in nine to 12 months, you'll see such an upgrade kit from IBM," he added.

The vendor said the new processors offer a 7% cycle time improvement, from 18.5 nsec to 17.2 nsec. The faster time is a result of a new 1M-bit memory chip that operates almost twice as fast as — but is only two-thirds the size of — the 1M-bit chip it replaces, according to IBM. Performance is also aided by a 32% more dense version of IBM's Thermal Conduction Module (TCM), IBM said. The number of channels in the machine was increased from 64 to 128, although the channel speed was not increased.

A 4M-byte card in the central storage arrays with the denser TCMs allows the maximum central storage of the Models 400E and 600E to increase from 128M to 256M bytes. The maximum offering for expanded storage has been doubled on the Model 400E and 600E processors to 1.024G byte.

The hardware improvements will allow better performance from software, IBM claimed. For example, IBM's IMS and CICS will work better with improved VSAM buffer management offered by the new hardware. Changes have also been made to IBM's DB2 to take advantage of the increased storage and buffering of the hardware.

Also announced were the 3088 multisystem communication unit Model A1, the entry-level member of the 3088 series. The Model A1 supports channel-to-channel communications between two IBM 370-based processors. It is functionally equivalent to the larger versions of the 3088 and can be upgraded to Models 1 or 2. The unit is priced at $50,000 and will be available in September.

IBM high end
New 3090 models

	150E	180E	200E	300E	400E	600E
MIPS[1]	10.1	15.6	31.2	46.9	61.5	79
Memory (Bytes)	32M-64M	32M-64M	64M-128M	64M-128M	128M-256M	128M-256M
Expanded Storage (Bytes)	128M	256M	512M	512M	1G	1G
Channels	16-24	16-32	32-64	32-64	64-128	64-128
CPUs	1	1	2	3	4	6
Entry-Level Price	$1.65M	$2.6M	$4.5M	$6.15M	$8.375M	$11.5M

[1] Millions of instructions per second, based on CW estimates.

CW CHART

IBM bridges gap between VM systems

BY ROSEMARY HAMILTON
CW STAFF

IBM last week responded to a long-standing need among its VM users by introducing a software package that allows two VM operating environments to share resources.

VM/Inter-System Facilities (VM/ISF), scheduled for availability in August, allows users on two separate processors running VM/SP HPO Release 4.2 to access data files on shared minidisks, as well as share spool files and directories.

Also announced, along with the new 3090 processor models, were new versions of VM/SP High-Performance Option (HPO) and the VM/XA operating system.

"If it's what I think it is, then ISF answers a long-standing requirement the users have been asking for," said Thomas O'Leary, manager of MIS technology at North American Philips Corp. in New York.

Until recently, IBM provided few tools to allow users at installations running multiple VM-based processors to share data and resources. MVS users, on the other hand, have had such capabilities for a number of years. With VM, each system functions as an individual environment, with limited capabilities for gaining access to another VM system's resources.

Independent vendors have filled this gap to some extent. VM/CMS Unlimited, Inc. in Dorchester, Mass., has been marketing a product for multiple-processor VM environments since 1985. The product is called Single System Image (SSI).

In addition to sharing data and spool files and directories like ISF, SSI also allows program-to-program communications, President Romney White said.

Late last year, IBM unveiled a VM-program-to-VM-program communications capability with VM/SP Release 5.

While last week's VM/ISF introduction marks another step toward creating a single VM environment that will be made up of multiple processors, it only supports VM/SP HPO Release 4.2. VM/ISF cannot work in conjunction with the program-to-program facility of VM/SP Release 5.

In addition, the product was designed to work with two processors only.

VM/ISF also was designed to work with the new version of IBM's 3088 (see story page 1).

VM/ISF will be offered under the vendor's graduated pricing structure, and users will be charged a software license fee for each of the two processors in the ISF environment. A one-time charge for IBM's Group 30 processors, such as the 3033, 3083 and 4381, will be $63,000 per processor. The Group 40 one-time charge will be $100,800.

Other software announcements last week included:

- Improved data management in DB2 and the MVS/XA Data Facility Product. Both use a revised buffer search algorithm that uses enlarged VSAM buffer areas in the new 3090 models.
- Additional features for the VM/Extended Architecture Systems Facility Release 2. It supports the 3090 Vector Facility and some additional VM/CMS programs. Available in June, it will have an initial license charge of $11,220 and a monthly license charge of $3,740.
- VM/SP HPO Release 5. Designed for a large processor environment, it will carry a one-time charge of $57,665 for Group 30 systems and $92,265 for Group 40 systems.

NEC unveils powerful line

BY JAMES CONNOLLY
CW STAFF

TOKYO — NEC Corp. more than doubled the power of one of its key mainframe lines last week with three families of processors based on the NEC ACOS 4 and ACOS 6/MVX operating systems.

The System 910, System 930 and System 830 are successors to NEC's System 1000, which has been sold in the U.S. for the past two years as Honeywell, Inc.'s DPS 90 mainframe.

The System 930 and System 830 are based on the System 2000, which NEC announced a year ago, and which Honeywell said it planned to use as a successor to its DPS 90. A Honeywell official noted that the System 930 and System 830 are compatible with Honeywell's GCOS 8 operating system, and that the System 910 is compatible with Honeywell's GCOS 7.

The System 910 runs ACOS 4 and the Systems 830 and 930 run ACOS 6. NEC claimed that the System 910's five models range in performance from 8 million instructions per second (MIPS) to 86 MIPS. It said the two models of the System 830 range from 8 to 43 MIPS and that the three models of the System 930 range from 45 to 86 MIPS. The high-end models support 64M to 256M bytes of memory.

NEC officials in the U.S. released only typical lease prices for systems being offered in Japan. The 24-MIPS System 930 Model 10 would lease in Japan for $158,544 U.S. per month.

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Faster 386 expected; memory problem cited

BY DAVID BRIGHT
CW STAFF

Intel Corp. is expected to announce in mid-February a 20-MHz version of its 80386 microprocessor that provides 20% more speed than the current 16-MHz version, according to sources. However, some observers say the faster chip may cause compatibility problems with existing hardware and software.

The faster 80386 chip is expected to be available to manufacturers in the second quarter. The only difference between the two versions of the chip is speed, the sources say. Intel is expected in the future to further advance the chip's clock rate to 24 MHz.

Many manufacturers of 80386-based systems, some of whom have designed their machines to accommodate up to 24-MHz versions when those high-end chips become available, will reportedly be able to incorporate the 20-MHz chip into their existing systems.

PC vendors wary

However, some personal computer makers are wary. Steve Holtzman, director of systems marketing at Wyse Technology, Inc., reports that Wyse will use a different architecture for the 20-MHz version of the chip than it does with its evaluation systems using the 16-MHz version because there is a break point between the 16-MHz and 20-MHz chip.

"When you get to 20 MHz and above, you really need to have an optimized memory scheme allowing an efficient use of memory at an effective cost," he says.

"Yes, you can sometimes design a system that can run at various speeds, but when you have a spread from 16 MHz to 24 MHz, like with the 386, there are significant differences in the total system," Holtzman notes. "If you design a system for 16 MHz and run it at 24 MHz, you're going to have lots of wait states or problems with your memory system."

While the faster microprocessors will maintain system compatibility with earlier versions of the chip, compatibility also may not be assured with some timing-sensitive add-on boards, according to Ron Nakashima, director of systems products marketing at Televideo Systems, Inc.

At add-on board vendor Quadram Corp., senior product manager Mark Butler notes that his company is working with computer manufacturers to investigate the compatibility issue. "We're not really sure what the ramifications are at this point," he says. "We are, of course, trying to marry ourselves as closely to the 386 as possible."

While it allows for faster systems, observers stress that this latest hardware advance further emphasizes the need for a Microsoft Corp. MS-DOS operating system that will take advantage of the extended capabilities of the 80386 or at least the 80286. Andy Seybold, president of The Seybold Group, Inc., a Torrance, Calif., market research company, says an 80386-specific MS-DOS probably will not be available until a year or a year-and-a-half from now.

In the meantime, manufacturers will target the faster chip for applications requiring lots of power, such as in technical workstations and multiuser systems, Seybold notes.

AT&T posts $1.17B loss

BY CLINTON WILDER
CW STAFF

NEW YORK — Like IBM, its counterpart in the computer industry, the world's largest telecommunications company suffered a disappointing 1986.

In results reported last week, AT&T's previously announced $1.7 billion restructuring charge resulted in a fourth-quarter loss of $1.17 billion, the company's first quarterly loss since the 1984 divestiture. For the year, income from operations, which excluded the charge, fell 8% to $1.43 billion, or $1.26 per share.

Full-year revenue also declined to $34.09 billion, a 1% drop from $34.42 billion in 1985. Fourth-quarter sales fell 4% to $8.53 billion.

Product sales of telecommunications and computer equipment dropped 9.4% during the year and 5.8% in the fourth quarter, the company said.

"Our earnings from operations were essentially flat, our costs too high and our results mixed," AT&T Chairman James E. Olson said.

AT&T's fourth-quarter charge of $3.2 billion before taxes was one of the largest taken by a U.S. company since AT&T's $10 billion pretax charge for divestiture-related expenses in the fourth quarter of 1983.

CDC sees profit by end of year

MINNEAPOLIS — Control Data Corp. Chairman and Chief Executive Officer Robert M. Price last week predicted that CDC will be profitable this year after weathering its severe fiscal crisis of the past two years.

The firm, however, will record a substantial loss for 1986. In results that will probably be announced this week, CDC will take a fourth-quarter charge of approximately $200 million for restructuring costs and inventory write-downs. In the first three quarters, CDC lost a total of $38.3 million on revenue of $2.44 billion.

Worldwide trade unions unite against Big Blue

BY SYLVIE HERIARD DUBREUIL
SPECIAL TO CW

PARIS — Following a meeting in London earlier this month, international trade unions have issued a scathing report criticizing labor practices at IBM.

About one hundred union representatives from 24 countries met in London on Jan. 12 and 13 to plan a worldwide union campaign within IBM.

Eager to give impetus to an attack on labor practices at high-technology firms in general, the organizers succeeded in forging a consensus concerning action aimed at the world's No. 1 computer maker.

The meeting was organized by three trade union bodies — the Postal, Telegraph and Telephone International, the International Metalworkers Federation and the International Federation of Employees and Technicians, a white-collar organization.

In a final report, the unions denounced what they called "the virulent antiunion attitude" of Big Blue as well as its "obsessive insistence to deal individually with each of its employees." Nonetheless, they acknowledged that the low level of union membership at the company is a result of the good salary and working conditions offered by IBM.

The unions decided to coordinate information gathering related to the multinational company, devote significant resources to their drive to unionize IBM employees, survey "all aspects of IBM activities and be ready to make public all the damaging consequences, both social and economic."

The unions plan to base their IBM campaign on documents related to multinational companies that have already been released by the Paris-based Organization for Economic Cooperation and Development (OECD) and the International Labor Organization. Both those documents have been officially recognized by IBM.

In their final report, the unions justified their actions on the basis of IBM's leading position in the computer industry and its movement into the telecommunications arena.

According to the 73-page report, IBM employs 405,535 people, 40% of whom work outside of the U.S. The level of union membership is almost nil, except in countries like France and Sweden where labor legislation institutionalizes union presence. Even in these countries, IBM union membership is lower than at similar companies.

The report is available to the public at the Geneva-based headquarters of the International Metalworkers Federation.

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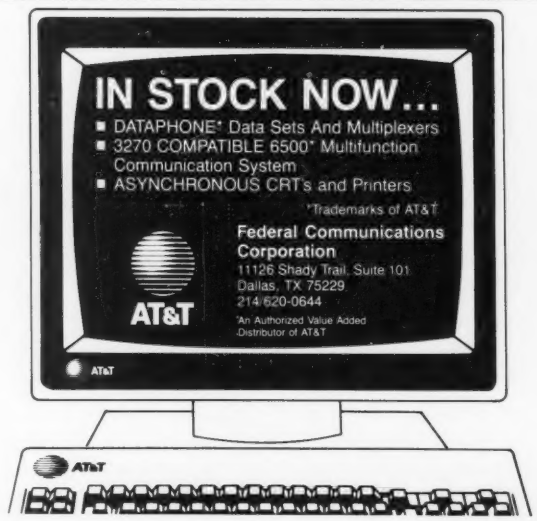

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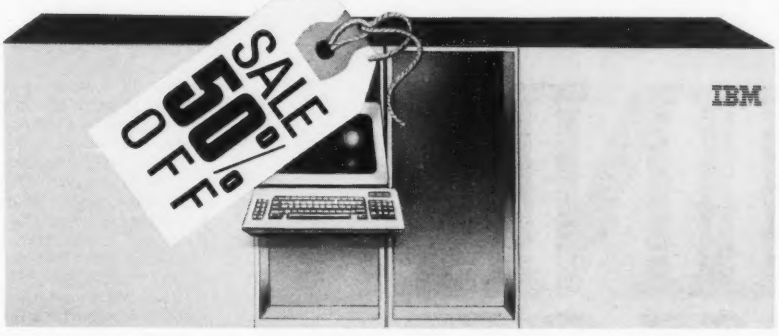

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Proteon, DEC to support FDDI standard

BY STANLEY GIBSON
CW STAFF

WESTBORO, Mass. — Swelling the growing stream of support for the Fiber Distributed Data Interface (FDDI) standard, Proteon, Inc. announced last week a migration path to the standard from its Pronet 80 network.

FDDI, the emerging 100M bit/sec. fiber-optic network design, is in the process of being cast by the American National Standards Institute (ANSI).

Proteon Chairman Howard Salwen explained that his FDDI upgrade plan allows Proteon to satisfy customers who require a high-speed, fiber-optic, token-ring network now but who also want a standard-based network in the future.

Salwen stressed that Pronet 80 equipment, including the fiber boxes and fiber cable, is usable for FDDI. "The major investment in fiber is the cost of the fiber and the fiber modules," he said. "The cost of a chip set is only a few hundred dollars."

Customers will receive hardware trade-in credit for their 80M bit/sec. interfaces toward the purchase of Proteon's new 100M bit/sec. FDDI products. Customers who wish to retain their existing Pronet 80 networks but may also want a future growth path to FDDI will be supported through an FDDI interface for Proteon's multiprotocol network router, the P4200 gateway, according to Salwen.

Proteon's Pronet 80 will ultimately be superseded by its FDDI network product. "I hope our experience with Pronet 80 allows us to build the best FDDI network. We donated our physical layer to the design, and the FDDI design is ours with one exception," Salwen said.

Priced at approximately $10,700 per node, Pronet 80 has 1,500 nodes currently installed in networks averaging 10 to 15 nodes each in size, a Proteon spokesman said. The product was introduced in April 1985.

Separately, a newspaper advertisement showed that Digital Equipment Corp. is in the process of hiring more than 15 major technical workers to work on developing an FDDI network.

> "DEC is putting a team together so they can react and develop around the standard as it is fixed."
>
> CLAIRE FLEIG
> INTERNATIONAL
> TECHNOLOGY GROUP

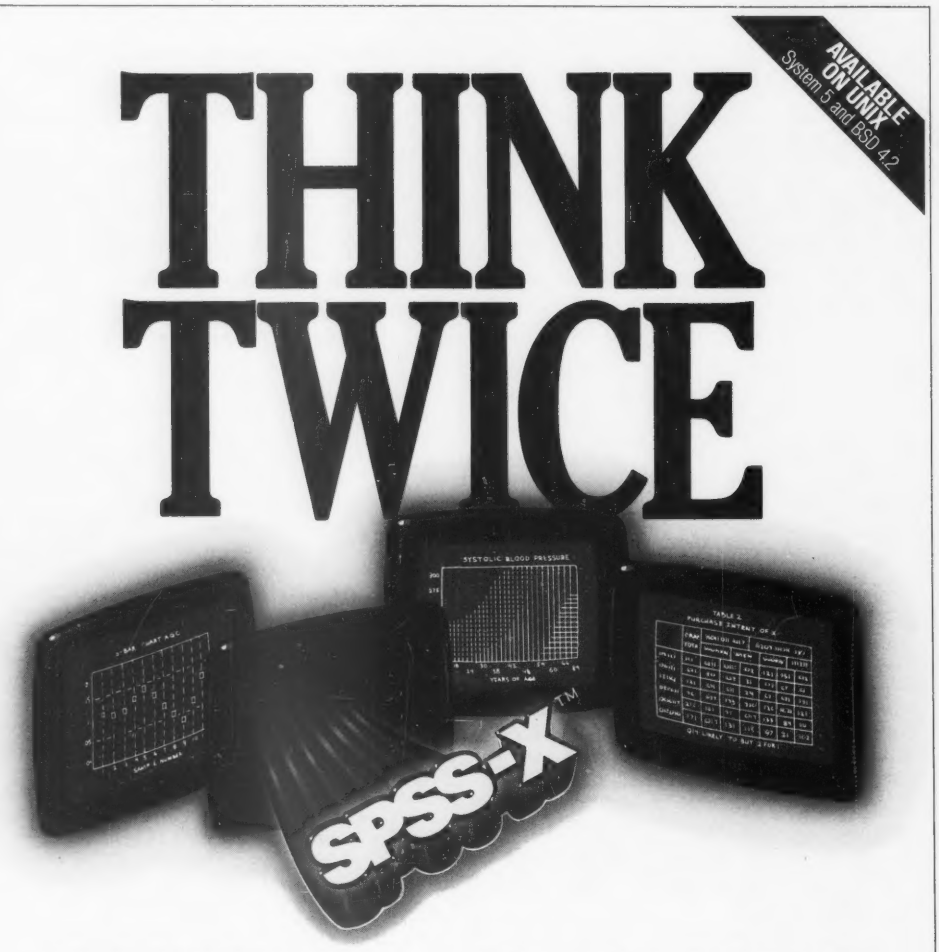
"DEC is putting a team together so they can react and develop around the standard as it is fixed," said Claire Fleig, an industry analyst with International Technology Group in Los Altos, Calif. She said FDDI products can also be expected from Wang Laboratories, Inc. and IBM.

"We continue to look at new technologies and do what we have to do to hire personnel," said Fred Balfour, local-area network product marketing manager for DEC.

Proteon Chairman Howard Salwen said "It's nice to have a strong leader like DEC making a commitment to the standard."

Salwen, who has been on the ANSI FDDI committee since 1983, said obstacles remain before a standard can be cast and that he is not optimistic about a rapid setting of the standard. "I think the committee is a long way off on a decision."

That slowness would set back the arrival of FDDI products on the market, he added. "The only way to make a commercial product is to use very large-scale integration, and to have VLSI require the standard be cast in stone," Salwen said, indicating that the standard must be set before large amounts of commercial activity can occur.



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3317-8785

STC finally challenges IBM cartridge system

BY ALAN ALPER
CW STAFF

NEW YORK — Moving to regain a leading position in the large-scale mass storage systems business, Storage Technology Corp. (STC) last week unveiled its long-awaited IBM 3480-compatible tape subsystem, which features automated tape cartridge handling capability.

STC estimated that the 4400 can load a cartridge in roughly 11 seconds, compared with two minutes for a human to mount a tape.

Announcement of the 4480 tape subsystem and 4400 automated library system come as STC prepares to emerge from 27 months of Chapter 11 protection.

The company, which said it expects to shed its bankruptcy protection within the next 45 to 60 days, still has a number of legal and financial hurdles to overcome (see story page 80).

The 4400, under development for the last two years, uses the same cartridge design developed by IBM for the 3480, featuring a 200M-byte, 18-track, ½-in. tape. The 4400's automated tape handling system, however, cannot be used with 3480 tape subsystems, STC said.

Aiming at 3480 users

Ryal Poppa, STC's chairman and chief executive officer, said the firm did not make the 4400's library mechanism compatible with the 3480 for obvious competitive reasons. STC is aiming its efforts at 3480 customers whose leases are running out and new prospects who are only now migrating from conventional reel-to-reel technology to tape cartridges. IBM has shipped roughly 17,500 3480s in the U.S., according to Freeman Associates, Inc., a data storage management consulting company based in Santa Barbara, Calif.

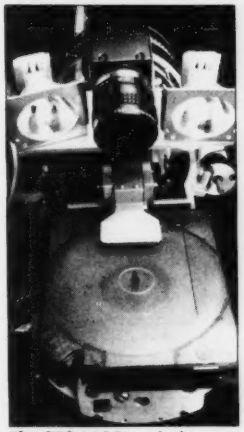
The 4480 will be generally available next quarter, although the automated library system will not ship until the fourth quarter. The firm is just now installing 4400s at four beta-test sites. STC declined to identify any of those sites. Company officials declined to project demand for the product or STC's ability to deliver in volume.

Ray Freeman, president of Freeman Associates, called the STC 4400 "an impressive product" that far surpasses the 3480 in storage capacity and efficient use of floor space. Freeman said he believes that customer acceptance of the product, however, will come after the company negotiates its way out of bankruptcy protection.

"Once they are out of Chapter 11, they'll be able to attract the customers who have stayed on the sidelines," Freeman said. "The fact that they developed a super product such as the 4400 while in bankruptcy is some accomplishment."

Freeman was not sure how many end users will require the automated tape handling capacity of the 4400. "It's tough to predict," he said. "This is a feature with no precedent, but it does put a tremendous amount of storage available in a pretty prompt way."

Memorex Corp. last week said it too plans to introduce a 3480-compatible tape drive within the next month. The firm declined to say whether it would offer automated cartridge handling capability or when the product would be available.



The STC 4400's ***robotic arm grasping the tape cartridge.***

With the 4400, STC is looking to capture a market that IBM has chosen not to pursue. Observers said they believe IBM had an automated tape handling mechanism under development for the 3480 but that the company killed the project because demand was not high enough.

"They found that out of the 300 million cartridges that were out there, only 10% required the fast access of this type of device," Poppa claimed. "That's a big market for us, and that's why we're pursuing it and why we have a two-year lead on anyone else."

Replacing DASD

The firm said many companies are looking to use cartridge tape drives to replace more costly direct-access storage devices (DASD) in some applications. Poppa pointed to computer-aided design and manufacturing, in which data such as old designs need not necessarily be stored on DASDs but could be stored on cartridge tape drives that would be automatically mounted.

One member of an STC customer advisory board who requested anonymity said that while he is pleased with the 4400, he is primarily looking forward to STC's participation in the 3480-compatible business. "The more competition in the marketplace, the better it is for users," he said.

The 4400 consists of four components: a 4480 subsystem, including controller and four cartridge drives; one or more library storage modules; a library management unit; and host software. The 4480 controller costs $62,000, while the cartridge drives, with four tape transports, cost $81,900. The library storage module, including the robot, costs $243,500, and the library management unit is priced at $57,925. An intial software license fee for the host management software costs $12,300.

The library storage module is a 12-sided structure measuring 92½ in. high and 132 in. in diameter and is said to house up to 6,000 cartridges. At the unit's center is a freestanding robotic assembly that retrieves, mounts and dismounts cartridges.

Attached to the robot is a camera that reads a label on each cartridge in either bar code or optical character recognition form.

Up to 16 libraries can be linked via pass-through ports that enable cartridges to be exchanged from one storage module to another.

The library management unit controls up to 16 interconnected library systems modules and can receive mount and demount requests from as many as 16 different hosts. It selects the appropriate library and instructs the robot to select the cartridge, validate the label, retrieve the tape and mount it into the closest drive.

STC has designed host software to control the robot's mounting and demounting of cartridges. It operates on any computer running the IBM MVS/XA operating system with either JES2 or JES3. No modification to the operating system, tape management system or user's JCL is required, the company said.

STC said that in the event the 4400 breaks down, cartridges can be mounted manually. Subsystems purchased without the automated tape handling system can be field-upgraded, the firm added.

Cartridge tape system

Storage Technology debut vs. IBM 3480

Features	IBM 3480	STC 4480
Capacity (in bytes)	200M	200M
Controller Unit	$65,430	$62,000
Drive Lapse	$43,120 (with two transports)	$41,000 (with two transports) $81,900 (with four transports)
Buffer (in bytes)	512K	1M
Data Rate (in bytes)	3M/sec.	3M/sec.
Head	Thin Film	Thin Film
Automation	Auto loader system stores up to five manually loaded cartridges with mount time of 7 sec.	Auto cartridge system with library storage module ($243,500) stores up to 6,000 cartridges with mount time of 11 sec. Library management unit ($57,925) manages up to 16 storage modules.

CW CHART

Compaq cuts Deskpro 2 price

HOUSTON — In an attempt to soldify the firm's move to more sophisticated architectures, Compaq Computer Corp. last week announced a consolidation of its Intel Corp. 8086-based Deskpro line and a $700 price cut for the remaining Deskpro Model 2.

"The 80286-based business PCs will become the mainstream this year," said Mike Swavely, vice-president of marketing at Compaq. "Many large organizations don't purchase anything other than 286-based systems."

The popularity of 80286 and 80386-based machines, which last year accounted for 75% of Compaq's business, may eventually cause Compaq to drop the 8086 product. "I can certainly foresee that time. At some point in the future, we will probably take out both the initial Compaq Portable as well as the Deskpro," Swavely said.

Compaq will continue to position the Deskpro Model 2 against the IBM Personal Computer XT.

Compaq dropped both the Deskpro Model 1 and 3 last week. The Model 2 for $1,699 comes with 256K bytes of random access memory and two 360K-byte floppy disk drives. The monitor and adapter are not included with the system.

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Stratus readies XA2000 series to take on Tandem high end

BY JAMES CONNOLLY
CW STAFF

MARLBORO, Mass. — Stratus Computer, Inc. is scheduled to launch a full-scale attack on its chief rival in the transaction processing market, Tandem Computers, Inc., with the introduction of a new line of systems today.

Stratus, which previously offered fault-tolerant systems competing with the lower half of Tandem's product line, is pitting the high end of its XA2000 series against Tandem's 10-month-old premier Non-Stop VLX processor. Both companies claim peak performance rates of more than 50 transaction/sec.

Stratus officials said they anticipate a near-simultaneous announcement this week from IBM, which sells Stratus-built processors as the IBM System/88 and is expected to add the XA2000 machines to the System/88 product line.

"We are selling into a market that has an insatiable appetite for transactions per second," Stratus Chief Executive Officer William E. Foster said.

"Most new applications for computers tend to be on-line applications. That is really what is driving the market. While people are looking at an on-line application, they have to ask themselves what happens if this thing goes down," Foster said.

Designed for growth

Stratus claimed its systems are designed to cope with 45% annual growth rates in the on-line transaction processing market for the next five years to average transaction loads of more than 50 transaction/sec. and the addition of more on-line applications.

Company officials cited the XA2000's capability to be expanded in a modular, on-line manner and the fact that it is designed to handle more powerful microprocessors as they are announced.

Like earlier Stratus systems, the XA2000 is designed for fault tolerance through use of duplicated hardware with a backup processor board, disk drive or other component picking up the processing if a component fails.

Stratus is announcing five models of the XA2000 series, although the XA2000 Model 100 is a transition product providing performance comparable to that of the older Stratus XA400.

> "WE ARE selling into a market that has an insatiable appetite for transactions per second."
>
> WILLIAM E. FOSTER
> STRATUS COMPUTER

The systems are based on Motorola, Inc. 16-MHz 68020 microprocessors and Motorola 68881 math coprocessors. Earlier Stratus systems used Motorola 68010 chips.

The XA2000 systems use a different chassis than the XA400 but similar enclosures. Stratus officials said the XA2000 Models 110, 120, 130 and 140 use a single 40-slot chassis and that upgrades from the 110 through the 140 are achieved through on-line board additions.

The Model 140 runs four tightly coupled duplicated CPUs.

Operating system

Stratus also is enhancing its operating system with VOS Release 6.0, which was designed to take advantage of the hardware changes, including a 32-bit data path and the math coprocessor.

Peter S. Kastner, manager of marketing support programs for Stratus, said the floating-point processor is designed to help users in existing on-line transaction processing markets perform tasks such as financial modeling. He said the company has no plans to use the 68881 capability to enter scientific or engineering markets.

The XA2000 reportedly supports 64M bytes of memory, a 64K-byte cache, a virtual address space of 128M bytes and 46G bytes of disk storage.

Stratus officials said the Model 140 provides three times the performance of the earlier Stratus XA600 using the ET-1 benchmark and 2½ times the XA600's power using Stratus's TP-1 benchmark.

Stratus claimed the transaction-per-second cost of the XA2000 is half that of Stratus's earlier products.

In addition, Stratus claimed ET-1 ratings of 15 transaction/sec. for the Model 110, 27 to 29 transaction/sec. for the Model 120, 37 to 40 transaction/sec. for the Model 130 and 47 to 53 transaction/sec. for the Model 140.

Analyst Thomas Henkel of the Yankee Group, a Boston-based market research firm, said of Stratus, "This is really the first time they have gotten into the VLX or IBM 3090 class in terms of on-line transaction performance, and I think it is a good move for them."

However, Henkel also questioned how long IBM will maintain its relationship with Stratus if the smaller company's products continue to compete with 3090 mainframes.

He said he doubts Stratus has enough application and data base software to support high-performance transaction processing, particularly in growth areas such as manufacturing.

Available now, the systems are priced from $260,000 to $500,000 for the Model 110 and from $770,000 to $1.1 million for the Model 140.

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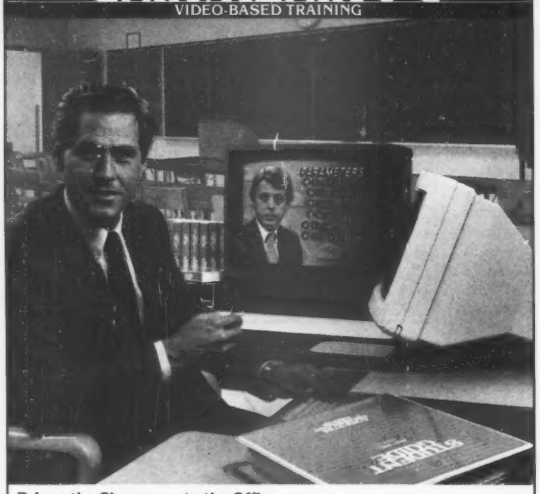

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OSI to embrace LU6.2 protocol

BY AMIEL KORNEL
SPECIAL TO CW

PARIS — Members of the International Standards Organization (ISO) have agreed on the specifications of an OSI transactional processing interface that is compatible with IBM's Advanced Program-to-Program Communication (APPC) interface.

The Open Systems Interconnect (OSI) interface opens up access to IBM's proprietary LU6.2 architecture.

A final draft document, which will be submitted to standards groups in each country, should be ready by mid-February in Washington.

"If the ISO document remains as it is," said one participant at a closed meeting of an ISO standards group here recently, "it will be possible to have a common interface to OSI and LU6.2."

Strikes a balance

Industry officials and observers contacted last week said the proposal seems to strike a balance between IBM's wish to restrict divergences between OSI and IBM's SNA and other vendors' eagerness to speed development of open-systems architectures.

But observers also warned that the proposal possibly could enable IBM to dominate future OSI development.

"It would be a major coup for IBM to capture a part of the OSI stack," said Joe McGrath, vice-president of office information systems at Stamford, Conn.-based market analysis firm The Gartner Group, Inc.

"If ISO looks to IBM for enhancing APPC, IBM will always be half a step ahead in OSI," McGrath contended.

While European industry officials argue that specifications outlined in the ISO proposal differ significantly from the IBM product, a senior IBM executive called the move a face-saving gesture that does not alter the technical spirit of IBM's protocol.

"They can't expect IBM to throw a significant piece of technology away," said the IBM source, who insisted on anonymity. "What clearly will happen is that European industry will offer a modified version of LU6.2."

Nonetheless, for most computer makers and OEMs, the move should provide a much needed impetus to develop OSI applications, which have been sorely lacking.

"Even if these firms all want OSI to succeed, they will never stop their SNA development," McGrath noted. "This will permit them to leverage work they're doing on the IBM side with their OSI development work."

"It will certainly take some of the work out of OSI," said Chris Lewis, consultant at London-based market researchers International Data Corporation Europa Ltd.

And users are likely to benefit from a faster move toward open systems. "The user will have the assurance of stability and flexibility, thanks to the fact that the interface is at a very high level," an official responsible for OSI development work at a major European vendor said. "It will be easier to port programs."

"Anything that permits users to evolve" from SNA to OSI without making a radical change "is advantageous," McGrath said.

The French, British and Italian contributions to the OSI subcommittee meeting were strongly influenced by a joint proposal submitted to them earlier by IBM, France's Compagnie Des Machines Bull and West Germany's Siemens AG [CW, Jan. 19], according to Marie-Claire Franon, an official at the Association Francaise de Normalisation, the French standards-setting body.

In what seems to be a departure from past policies, IBM did not raise any copyright or licensing issues in its joint proposal with Siemens and Bull, according to sources who have seen the proposal.

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EDITORIAL

Turnabout fair play

Try to imagine a ship — a very large ship, a supertanker, mega-cruise ship and battleship all in one — trying to negotiate an about-face in a narrow fjord, where it has strayed from open waters.

It takes all the power the ship can muster just to come about, since currents are actually pushing it deeper into the fjord as it turns. But it *will* come about, and once it does and gets its engines cranking full speed ahead. . . .

This ship is IBM. At present, most attention is focussed on what's wrong with the company, just as two years ago, few chose to see beyond the company's successes at that point in time.

There's plenty the company is doing right, however. And while IBM resets its course, there are opportunities for users that may not crop up again for some time.

On the high end, the company's battle to keep Amdahl Corp. and other compatibles makers at bay will continue to put a considerable downward pressure on price/performance curves. IBM continues to confound users with the barriers it erects to certain upgrades. And the 3080 remains a line that refuses to die. These and other factors will result in the IBM's beefed-up sales force playing the most aggressive version of "Let's Make a Deal" in years.

IBM's sales support and maintenance functions have, if anything, improved. These are areas in which other companies in relatively hard times have had to cut back. They're also areas, however, that fuel increasing profits even in the face of declining machine sales for IBM.

Within a few months, the company will start to feel the positive effects of shedding 10,000 people from its payroll. More important, IBM has moved more than 2,000 middle managers into direct sales and support functions, which should translate into greater customer support, especially now, with IBM facing a new high-end competitor in Digital Equipment Corp.

Perhaps IBM's biggest ace in the hole is the lowest cost production capabilities it bought with billions of dollars of capital investment in the last decade. This investment may have put the company in an excess capacity situation recently, given the weak demand for large systems. But it has also enabled the company to react surprisingly quickly in order to shave months off production and shipment schedules, again to the benefit of both the bottom line and customers.

In hindsight, it seems IBM is largely the victim of its own successes in the mainframe market, successes that seemingly blinded both the company and the Wall Street intelligentsia to the limits of growth of such an enormous organization. IBM's production muscle and a booming post-recession economy in the early 1980s fostered unprecendented growth for such a huge company, and this bred myopia regarding future growth. In the past year, IBM investors have recorded more than $20 billion in paper losses.

Getting back on course may see IBM acting as solicitous to its customer base as it may ever need to. It is a situation well worth exploiting.

LETTERS TO THE EDITOR

On systems design

J. Robert Riggs says in his article, "Twelve DP myths that just won't die" [CW, Oct. 6], that it is a myth that systems design cannot be separated from programming. Systems design can no more be separated from programming than architecture can be separated from engineering. A building can't be designed without knowledge of structures and the capabilities of construction materials, and a system can't be designed without knowledge of its structure and the capabilities of its materials. True, the designer does not have to be the actual programmer — although he could be — but he better know how to program.

I also take exception to Riggs's statement that "Coding from design specifications is rote clerical work." It wouldn't be hard to come up with design specifications for the "Mona Lisa," but does that mean that you could give anybody the specifications and a paintbrush and have him paint it? Design specifications spell out exactly what the system has to do, they don't spell out how to do it. If the design specifications are so detailed that writing a program from them is rote clerical work, then the programming has already been done. He also says MIS people "are reputed to be always behind schedule, over budget and capable of inflicting harm when implementing a new system." Maybe that's because the managers are listening to consultants and hiring clerks instead of programmers.

Riggs says "MIS professionals seem to have an irresistible urge to begin coding before the systems design is complete." The systems design is not complete until the customer has the system he wants. The customer isn't going to know exactly what he wants until after he sees the system that the analyst thinks he wants. I wouldn't want to be given a system and be told, "Here it is — don't ask for any changes, because we don't want to recode." It is impossible to have a complete systems design before doing any coding.

Riggs also claims programmers have no need for any contact with the user. It does not make a lot of sense to me to have a systems analyst tell a programmer, who probably earns half as much, "Mrs. Jones wants the date on the left side of the report instead of the right. Oh, and she also wants a pie chart on the bottom of page six. What do you mean we don't have a software to do that? I know our laser printer can do graphics."

Myth No. 13: Presidents of DP consulting firms know what they're talking about.

Steven H. Gove
Staff Engineer
Hercules, Inc.
Wilmington, Del.

Clever but inflexible

Several software packages designed to help the user express himself clearly in writing, such as the one described by William Zachmann in the column, "Becoming a Better Writer" [CW, Dec. 15], have appeared on the market. These packages provide an example of what the computer can do for us and what we should not expect of it. Yes, in order to ensure readability, one should prefer the active voice and avoid long sentences and jargon. However, these are only starting points. Good writing is based on the writer's judgment of what is appropriate in a given context. If you are writing for Ph.Ds, you do not want to write in a style appropriate for fifth-graders.

A software package may give guidance in unstructured tasks such as written expression, but it cannot size up the circumstances; only a human being has the mental flexibility to do this.

The answer to the problems of written communication troubling so many people in business and the professions today does not lie in a software package, however clever, but in the hard work required to develop control, flexibility and judgment.

Jean Datta
Instructor of Business Writing
United National Industrial Development Organization
Vienna, Austria

This week in history

Feb. 7, 1983:
International Reporting Information Systems (IRIS) is sent into bankruptcy by financial backers, who abruptly cut off additional development money. IRIS, a computer-based intelligence agency, was founded in late 1982 for private organizations.

A Bentley College professor says home computer sales will not take off for at least 10 years because of people's resistance to new technology. According to the academician, home computers are likely to remain a fad until a generation of computer-literate children impact the market, which will cause sales to jump.

Envisioning an office that is fully automated

The complexities of a world of fuzzy connections

AMY WOHL

Offices are places where information is collected, processed and stored. Historically, these functions took place on something visible, tangible — from stone to papyrus, and parchment to paper.

Whatever the medium, there were the usual migration problems at the technology transformation borders. (Can you imagine the office manager going from stone tablets to papyrus? Just look at the document storage compression savings. Listen to the naysayers pointing out how much less durable the papyrus will be.)

In the end, the traditional office generally dealt with a single kind of storage with no profound ability to combine or rearrange existing documents into new ones. The automated office is a different kind of place.

A big organization today still runs mainly on paper. It will continue to do so for a considerable time, not because a paperless office is impossible, or even difficult, to design. It will continue because the supporting infrastructure — the world in which everyone has a workstation with him all the time — just doesn't exist yet.

Even those of us who are highly automated communicate with people who are automated only some of the time, or even not at all. We live in a world that is partly computer-based, a world that includes paper, microfilm and now compact-disk/read-only memory reference books and optical-disk storage. Rather like tax "simplification," our attempts to automate the office are going through a stage where everything has become more complex. We are overwhelmed by choices that lead us into the maze then steer us to a deadend. Brand A computer is better for writing, but less-than-compatible with our delivery system. Brand B storage scheme is cheap, but hard to use and incompatible with editing of the document. It is the *connections* that appear to be fuzzy or missing.

The real world should look more like this: I write on my device of choice. It fully supports me with access to anything I've ever written and any reference material I might need. It offers spelling, grammar, style and other writing support — with full knowledge of writing style. Distribution is swift and automatic, not only forwarding the article directly to its destination, but automatically converting it to that computer's needs. Storage is also automatic, including placing references to the article into my own and outside data bases.

We could actually make versions of these things happen, but they would require much manual intervention, thought and considerable effort for conversion. Also, any variation in behavior would immediately limit the degree of automation available.

The fun has just begun. As we enjoy new advances in technology — electronic publishing comes to mind — our linkages become more strained, and a seamless, end-to-end environment becomes harder to achieve. After I have beautifully laid out my desktop-published document on my specialized workstation, how do I get it to my editor's PC?

Will some of us become stepchildren, doomed to seeing only uninteresting, unenhanced versions of the elegant and colorful world others can access? Nearly all the implemented office automation is based on time-shared minicomputers and dumb, or nearly dumb, terminals, an environment that did not contemplate full-color, bit-mapped, multifont images with graphics.

What we need is a well specified and accepted infrastructure so new technologies can easily fit in. If that structure is sufficiently rich, it could absorb technological advances. Our problem stems from the fact that PCs set the standard for the infrastructure — and that standard is vastly different from formal DP and office automation as originally contemplated. Now is the time. My resolution is to put all my energy behind vendors who work within broadly accepted standards. There is no need for a single standard. Our needs are for a technicolor spectrum of possibilities, not a single black-and-white choice. We need broad bridges between the standards that assume the user will only describe his own environment; the system must understand how to provide the interconnection.

The goal: to get anywhere from anywhere; to include anything within anything else; to send anything to anyone. And to do it without becoming a full-time hacker.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

To dream, perhaps of DRAMs

CHARLES P. LECHT

At the forthcoming International Solid-State Circuits Conference in New York on Feb. 25 to 27, Nippon Telegraph and Telephone Corp. (NTT) will announce the creation of a 16M-bit dynamic random-access memory (DRAM) prototype. With circuit widths as small as 0.5 microns and an access time of reportedly less than 100 nsec., I call this the "dream DRAM."

This achievement fulfills the dreams of the semiconductor world to produce submicron (less than a millionth of a meter) circuits, group them on a single chip and access them in times nearing those in the picosecond (trillionth of a second) world.

Observing that 16M bits is the same as 2M bytes, we note that at 1 byte per character (which is the case for English), 10 characters per word, 300 words per page, the dream DRAM could contain more than 666 pages of English text.

In the mid-1950s, it took 400 cubic feet to house 1 million characters of memory for the IBM 650 computer. Between 1959 and 1964, this storage requirement dropped to 100 cubic feet and by 1971 it was 8 cubic feet.

With the introduction of the metal oxide silicon 2K-bit (250 characters) chip in 1972, the same 1 million characters were capable of being housed in a single cubic foot. From then until the end of the decade and into the 1980s, when the 256K-bit (32,000 characters) DRAM became commonplace, the volume needed to contain a million characters slid to less than a 6-in. cube.

Just two short years ago, prototype 1M-bit (125,000 characters) chips emerged that are today routinely manufactured in the U.S. and Japan. Since only eight of these are required to obtain a million characters of memory, a cube less than 2 inches on a side suffices to house 1 million characters.

Now we can truly appreciate the NTT dream DRAM's position in the scheme of things — 2 million bytes in the space required by a single chip.

It's a bit much to believe that today's 16M-bit dream DRAM will see practical use before the 1990s, but I'd not wager too heavily against it. No one expected the assembly-line manufacture of 1M-bit chips to occur in the mid-1980s. The prospect of 2 million bytes of RAM available in a desktop computer is exciting.

CHRISTOPHER BING

True, current hardware architectures for desktops machines must change to make the most efficient use of chips with capacities above 1 million bytes, and a lot of new software must be created. These details are minor; the benefits to be obtained through large high-speed memories far outweigh the headaches encountered incorporating them into tomorrow's systems.

ALL the data we may ever need will become available on demand and as fast as we want it.

As anyone who has been using desktop computers will attest, providing a runtime disk-free environment for applications operation is a high priority. Having finished oohing and aahing over desktop computers, many people are getting bored with waiting as their systems beg for data from a slow-moving floppy unit or even a faster hard disk.

For those large systems users, the appearance of massive, fast RAM facilities means they can expect incredible speed increases in millions of instructions per second, floating-point instructions per second and logical inferences per second. Since roughly two-thirds of the delay time in applications operation is caused by interchip communications, increases in the number of circuits that can be engraved in one chip pays off big.

The usefulness will be seen in all the classic supercomputer applications — such as nuclear energy, weather, chemistry, airframe simulation and artificial intelligence. Even with today's Cray Research, Inc. systems, physicists are limited in the amount of detail they can use to model events because of insufficient RAM memory operating at fast enough speeds.

In my mind's eye, I envision at places like Livermore Laboratories and Los Alamos National Laboratories as one might imagine a group of space pilots awaiting the day when the proper vehicle would arrive for them to travel to inner space to test their theories on what they may find on arrival. The vehicle has to take them ever deeper into the world of the atom, where things are measured in fermis (trillionths of a meter).

Because they must deal with fermi-world spaces and relate these to the world in which we live, the data bases generated by their computations would be nothing short of huge.

Resolving problems

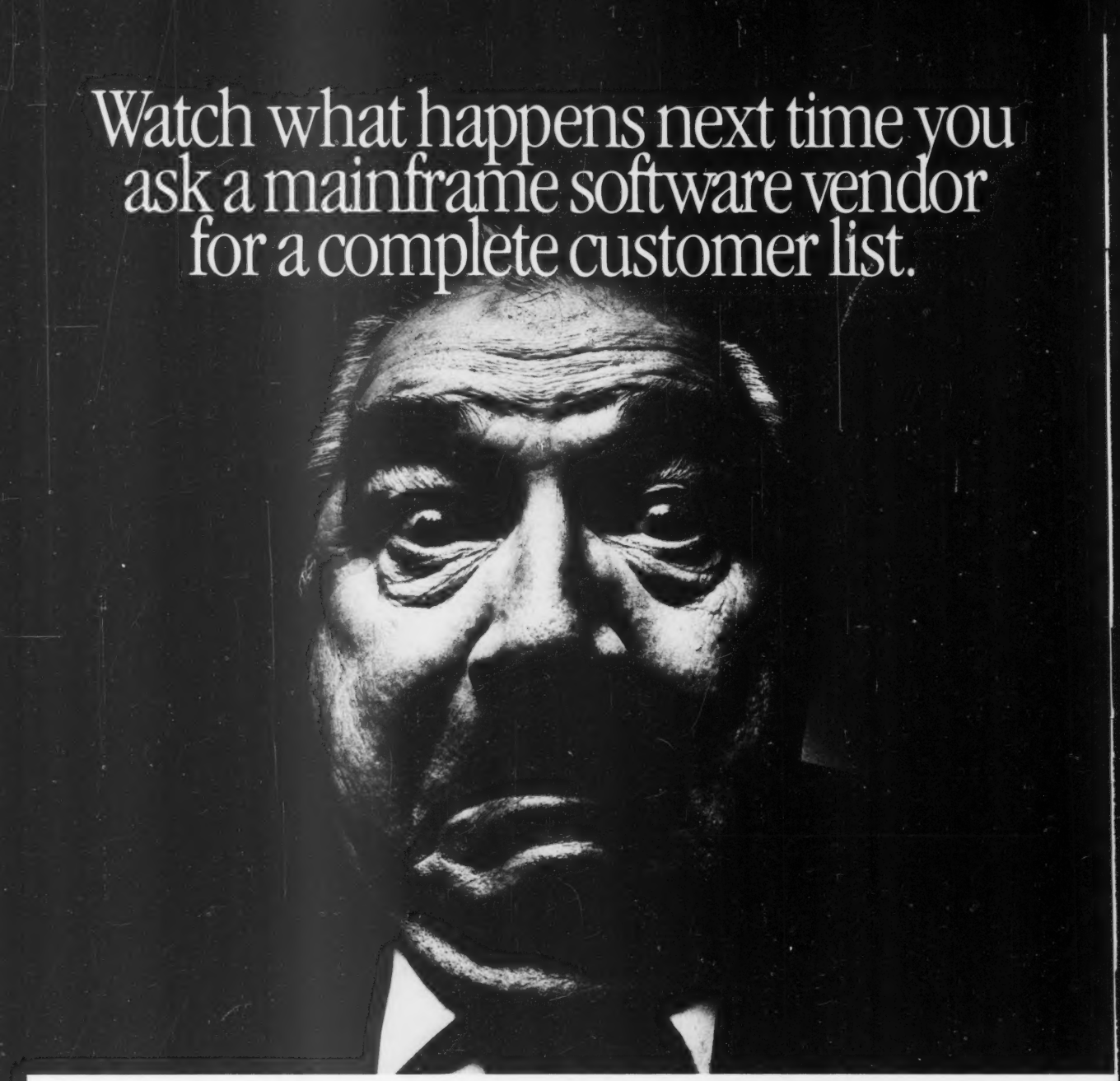
With the appearance of NTT's 16M-bit dream DRAM, we have further reason to hope that the problems caused by memory size and speed limitations for all ranges of systems are on their way to being solved. If things proceed as they have, we can expect further dream DRAMS: a 64M-bit chip followed shortly by one with a capacity of 256M bits. After that, we won't be too surprised with the announcement of the first gigabit dream DRAM — a billion bits on a chip (125,000,000 characters).

It's my bet that these chips will appear well before the end of the century. And with their appearance, the oft-spoken-of I/O logjam will be resoundingly broken. All the data we may ever need will become available on demand and as fast as we want it.

When we have the capacity to receive real-time right answers to all the questions we care to ask, we won't spend more than a picosecond to end today's Information Age. We'll herald the arrival of the Question Age — one dedicated to providing the right questions.

Lecht is chairman of Lecht Sciences, Inc./Japan, a Tokyo-based software think tank specializing in graphics. He is also an elected public member of the Hudson Institute and a free-lance science writer.

Watch what happens next time you ask a mainframe software vendor for a complete customer list.



You may get a convincing song and dance, but underneath it's a different story. Behind those pat answers that software vendor is actually sweating and squirming.

Why don't they want you to see a complete list? Simple. They know that their size and name familiarity do not guarantee happiness. Many "single source" or "all-things-to-all-people" vendors have, at best, uneven quality across a multi-application product line. They know that their customer list may contain a good number of less-than-happy clients. It's difficult for these vendors to commit the human and monetary resources necessary to produce the type of superior product available from a firm that specializes in a single application area. A firm like Data Design.

Data Design develops mainframe financial applications software. Period. We understand all our users' requirements and are therefore able to provide the necessary support: over 40 percent of our support and installation staff are CPA's or have MBA's.

Data Design doesn't balk at giving prospective customers a *complete* customer list. That's because hundreds of FORTUNE 1000 companies have reaped exceptional results from our financial software systems. Alcoa, Gerber, Pillsbury, Sherwin-Williams, Merrill Lynch, Bankers' Trust, Bristol-Myers, Federal Express, Litton, Lloyd's Bank, The New York Times Company, Owens-Corning, Royal Business Machines, Warner-Lambert and hundreds more have opted for Data Design over other major vendors. Write for our complete customer list and ask *anyone* on it about our fast, trouble-free implementation; system flexibility and ease of use; in-depth training and responsive, knowledgeable support; *management level* people in customer service positions, and more.

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SOFTALK

Charles Babcock

Big Blue gets relational

"For all intents and purposes, IMS is dead. It is old technology. Everything that is new is going to be built on the DB2 engine."

To a DB2 users group in New York, these words — coming from a former IBM employee and an advocate for DB2 within IBM — couldn't be mistaken as equivocal.

IBM is moving rapidly in the direction of relational technology, and it has decided it wants to get there as quickly as possible because of the simplicity, flexibility and precision inherent in its operation.

Implicit in this move is the fact that distributed relational data base management systems, with their common SQL language, offer a means of bridging some of IBM's incompatible systems and tying end users closer to central mainframe resources.

The apostle of this direction is Sharon Weinberg, president of Codd & Date Consult-

Continued on page 22

Referential integrity eludes DB2

Top priority for users, distant goal for IBM

BY CHARLES BABCOCK
CW STAFF

NEW YORK — IBM is developing a data dictionary for DB2, but referential integrity is a more distant goal, a company official said recently.

Marilyn Bohl, IBM's DB2 product manager at its Santa Teresa, Calif., development lab, could not comment on when either feature might be available but noted that the need for referential integrity could not be allowed to hold up other improvements that could be announced more quickly.

Bohl said the IBM development team realizes referential integrity is a top priority of DB2 users, but "you're not going to see it the next thing out of the box."

Bohl made her comments before the organizational meeting of the Greater New York DB2 Users Group Jan. 22 at the World Trade Center.

Bohl said there were no insuperable obstacles to providing referential integrity in DB2 but that "it's taking longer than some other things."

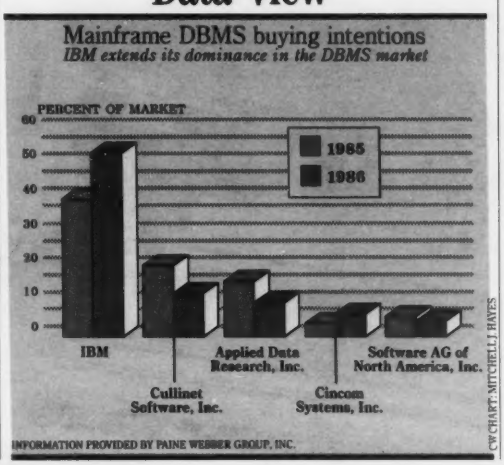
With referential integrity, a data base administrator attempting to delete information from one file would be prevented from doing so by a constraint built into the system if it were needed in conjunction with another file. In the same vein, an attempt to delete information in a "parents" file could be enforced against a "dependents" file as well, if the system was set up to enforce the elimination of the information from all related files, Bohl said.

Also speaking to the 150 users at the meeting was Sharon B. Weinberg, president of Codd & Date Consulting in San Jose, Calif.

Weinberg, the former senior

Continued on page 24

Data View



Unicorn CICS runs with VM

BY ROSEMARY HAMILTON
CW STAFF

LOS ANGELES — Unicorn Systems Co. introduced a CICS runtime environment earlier this month that it said will run directly under the IBM VM and VM-compatible operating systems on departmental computers.

Initially, the vendor will offer VMCICS for the Canaan Computer Corp. departmental systems that run under the Canaan Operating System. The operating system is reportedly compatible with the VM/CMS operating system and can run IBM CMS applications.

Continued on page 24

Cullinet preps VAX DBMS

BY CHARLES BABCOCK
CW STAFF

WESTWOOD, Mass. — Cullinet Software, Inc. has introduced the first of what it plans to be a series of software development tools known as IDMS/Architect, and company officials claimed they are moving toward a promised delivery of a relational data base management system for the Digital Equipment Corp. VAX this fall.

Cullinet officials also said the firm's $20 million investment in banking applications will bear fruit by the middle of this year, when it will offer an integrated package to compete with the likes of IBM-marketed Hogan Systems, Inc. and Dallas-based Uccel Corp. banking software.

Cullinet Vice-President of Marketing Jeffrey P. Papows said that Cullinet realized 15% to 20% of its revenue in 1986 from application sales and anticipates that 25% to 30% of this year's revenue will come from that source. By 1990, 50% of revenue will stem from applications, he predicted.

The first part of IDMS/Architect, Automate Plus, is an $8,000 personal computer-based tool useful in developing application prototypes. It includes a diagram editor with 12

Continued on page 24

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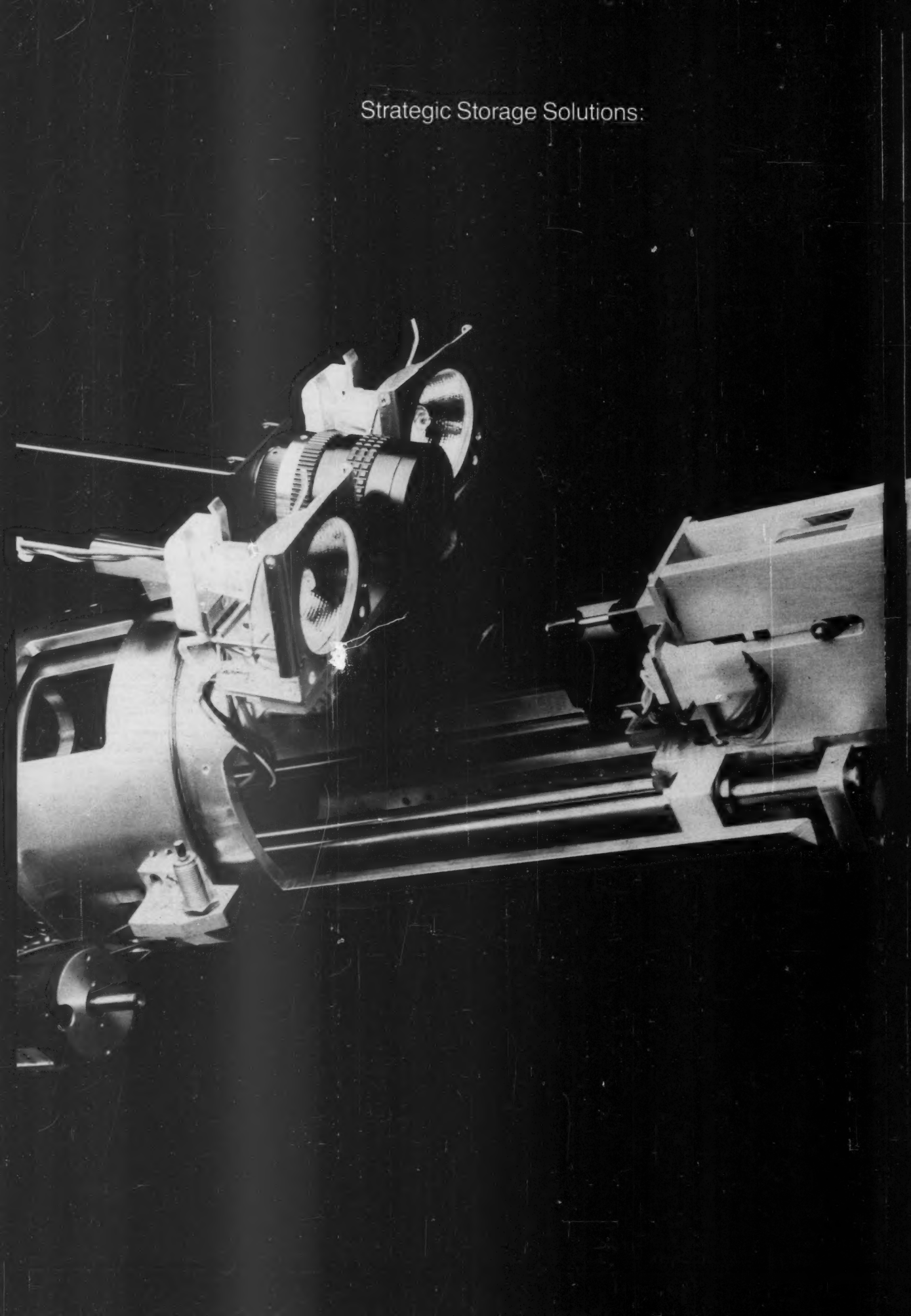

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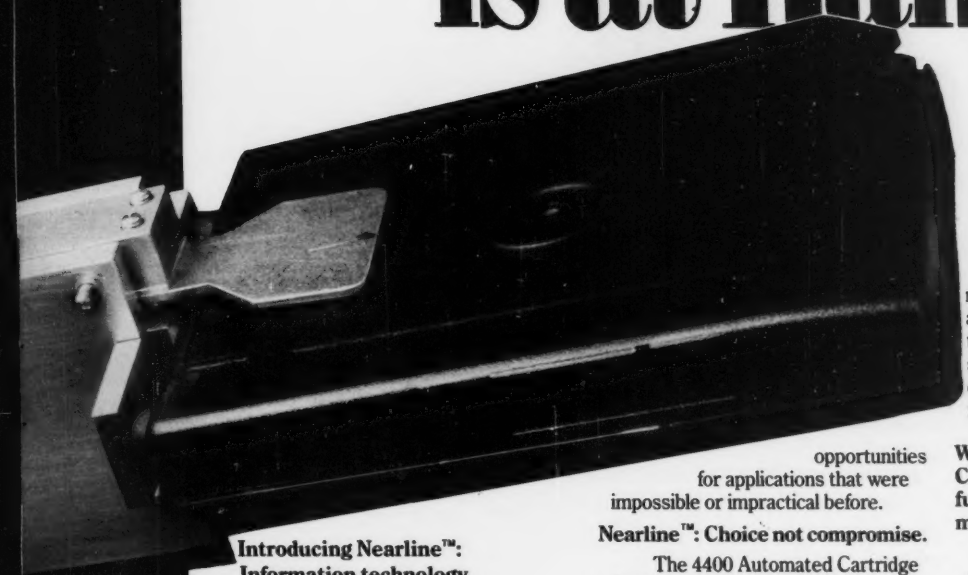

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Big Blue

FROM PAGE 19

ing in San Jose, Calif., and former senior technical planner for the DB2 development team. It was Weinberg, if we read between the lines correctly, who served as one of the fighters in the front lines within IBM for DB2. She left IBM last April to join the firm founded by two of her former coworkers, Edgar Codd and C. J. Date.

No longer hampered by IBM restraints on talking about future products, Weinberg predicted not only a data dictionary for DB2 but highlighted the significance of relational technology to IBM customers.

The managers of large mainframe shops, particularly those moving DB2 into production systems, have a sense that DB2 is important in ways they do not yet understand. There is even a growing suspicion that DB2 was hobbled in some fashion in its early releases so as not to compete too directly with IBM's huge installed base of IMS data base management system sites.

Weinberg addressed these concerns directly when she urged the 150 DB2 users present to "get off your duffs and start using this technology to build applications. The more you do now, the less you will have to convert later."

Marilyn Bohl, IBM's DB2 product manager, also addressed the DB2 users group and told its members that IBM's R Star project, an outgrowth of the relational System R project, has done extensive research on distributed data base systems.

While no specific product has emerged, the project has stirred the interest of the firm's Systems Products Division and Entry Systems Division, "which might be interested in relational technology for the PC," Bohl said, and has even interested the folks in Rochester, Minn., who already have a relational data base locked into the System/38's operating system, she said.

Weinberg addressed the issue more directly. When IBM starts delivering distributed data base technology, "it's going to be a knockout in the marketplace," she predicted. "A lot of this technology — not all of it, but a fair amount, enough to get started — has been worked out in the research labs," she said.

The implications here are enormous, because relational data bases sharing a standard SQL can theoretically run on different machines under different operating systems and still work together. Relational technology offers IBM the means of tying departmental and personal computing to the mainframe and sharing both data and applications.

The technology gives IBM software ammunition with which to confront another hardware vendor that has pushed into its own domain: Digital Equipment Corp. "Distributed data bases will allow IBM to start moving in on DEC the way DEC has been moving in on IBM," Weinberg asserted.

Weinberg said a single data center could provide scientific and engineering processing power along with business applications and graphics functions to many of the same users. "Imagine marrying Distributed Office Support System with DB2," she suggested.

In the end, a relational data base may help MIS managers reassert their control over corporate computing and tie end users to central resources. With training and the right interface, a relational data base is easier to use and offers more responsiveness to end-user needs than its heirarchical or networked predecessors. And that is a technology that MIS professionals will ignore at their own risk.

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Unicorn CICS

CONTINUED FROM PAGE 19

Unicorn also said it will market its software for the IBM 9370 departmental systems at a later date.

Currently, IBM does not offer a version of CICS that runs directly under its VM operating system. As a result, users with VM-based systems are required to run another IBM operating system, such as MVS, as a guest under VM. CICS then runs under the guest operating system.

Because of this, Unicorn claimed its product has an advantage over IBM. Since VMCICS runs directly under VM or a VM-like operating system, it saves disk, memory and CPU resources, the spokesman said.

VMCICS enables users to port Cobol and assembler command-level programs to the Canaan departmental systems for production, the vendor said. In addition, command-level CICS applications written in MicroCICS, Unicorn's CICS development software, can run under the VMCICS environment.

Unicorn President Michael Scroggie said he is certain IBM will eventually release a version of CICS for its VM operating system, but he said he does not expect such a product for at least another year.

VMCICS will be available in March for the Canaan systems, and it carries a license fee of $14,500. MicroCICS for the Canaan computers has a license fee of $16,500, Scroggie said.

Cullinet

CONTINUED FROM PAGE 19

diagram types including data flow diagrams, data models, system run charts and data structure diagrams for Cullinet's data base management system, IDMS/R, and fourth-generation development language, ADS/Online.

Automate Plus includes both physical and logical design techniques, employing entity modeling and relational data analysis. A menu-driven graphics tool allows the creation of analysis and design information in a diagram, which can be stored in a data base.

Papows said Cullinet's customer base has been eager for additional development tools and that Automate Plus, which became generally available in January, will contribute $1 million in revenue to Cullinet's first-quarter results.

On other fronts, Papows said Cullinet has shipped Release 10.2 of IDMS/R — which includes support for IBM SQL queries — to six customer test sites.

Cullinet was aided in the speedy delivery of SQL support by its acquisition of Esvel, Inc. last summer, which offered an OEM relational data base management system with an SQL interface. Cullinet will offer the Esvel product for the VAX.

The Esvel product as originally designed was a mainframe relational DBMS, but Papows said Cullinet has no current plans to offer it alongside its IDMS/R product.

Referential

CONTINUED FROM PAGE 19

technical planner for the DB2 development group in San Jose, predicted that IBM will issue a new release of DB2 within six months with both performance improvements and a data dictionary.

When asked specifically about a DB2 dictionary, Bohl said, "I won't get aboard a specific time frame like six months, but I will get aboard a time frame like the near term. It's certainly closer than a system repository," a reference to IBM's unannounced global system resources management project.

Weinberg said DB2's performance will improve "as we go from release to release," both through better data management techniques and optimization of the underlying engine.

"That engine under the covers is a very rich and very robust engine. It represents a form of artificial intelligence being embodied in a data base engine," she told the group.

IBM can revise engine

IBM can revise the engine if it wants because of DB2's high level interface to applications. "If she chose to do it, Marilyn could strip out that engine and rebuild it without affecting your programs," she said, referring to Bohl, her cospeaker and former coworker.

Weinberg predicted that future releases of DB2 will include support for primary keys, foreign keys and domains. A primary key is the unique field in a relational table that identifies it. A foreign key is a field in one table that matches the primary key in another table. Weinberg described domains as "akin to application data types." In addition, she said, both DB2 and other vendors' relational products will move toward support of the three integrity rules promulgated by Edgar Codd, author and president of the Relational Institute in San Jose, Calif., in his relational model.

Bohl said the SQL standard recently published by the American National Standards Institute, Inc. is "95% compatible with IBM SQL."

Even with minor differences between the standard and IBM SQL, DB2 will be kept compatible with the ANSI standard.

The SQL language will continue to evolve, and "hopefully the standard will evolve in step with it," Bohl said.

Weinberg estimated there were 1,200-1,300 sites using DB2; Bohl said IBM is "well on its way toward 2,000" sites.

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System software

Unisys Corp. has announced the **Knowledge Engineering System II** (KES II) expert system software said to enable knowledge-based or expert system applications to be developed and executed in a traditional information processing environment.

KES II is said to offer prepackaged expert system components, including user and program interfaces and a selection of three reasoning methods. The system is said to be portable and integratable with existing applications software.

KES II is out for the Unisys family of Microsoft Corp. MS-DOS-based personal computers starting at $500 and for Unix OS-based Series 5000 departmental computers ranging from $1,000 to $20,000.

Unisys, P.O. Box 500, Blue Bell, Pa. 19424.

Template, the software division of Megatek Corp., has announced the **Figaro software controller** for the Silicon Graphics, Inc. Iris Workstation.

The Figaro controller is said to provide full Programmer's Hierarchical Interactive Graphics System functionality on the Iris system and to take advantage of Iris's three-dimensional geometry engine to perform dynamic modeling and viewing. Figaro was designed for two- and three-dimensional modeling applications.

The Silicon Graphics version of Figaro costs $8,000 for the first workstation and $4,000 for the second.

Template, 9645 Scranton Road, San Diego, Calif. 92121.

Systems Technology And Research has announced **Q & D**, an entry-level productivity system for OS mainframe users.

The Q & D system is said to feature a structured programming language, data manipulation aids and line-printer graphics. It can be used to create reports, do CPU saturation forecasting, plan projects, populate and reformat files and generate spreadsheets.

A Q & D site license costs $2,500.

Systems Technology And Research, P.O. Box 3278, Humble, Texas 77347.

Data base management systems

Database Applications, Inc. has announced a relational version of its **NPL** data base system for the Hewlett-Packard Co. 9000 200/300 series desktop computers.

NPL includes business applications such as scheduling, accounting, budgeting, document tracking and inventory. Features include painting of data entry screens with controls on value ranges; data types filled and required fields; report writing using English-like sentences for sorting, formatting and screening; statistics; full-screen editing; and joining of data from different files to create reports.

The NPL relational data base management system costs $1,190.

Database Applications, 400 Wall St., Princeton, N.J. 08540.

Development tools

Advanced Technology International, Inc. has announced **Super PDL Version 4.2**, an enhancement of its Digital Equipment Corp. VAX-oriented design tool.

New facilities include Ada code generation, Department of Defense Standard 2167 compliance features and expanded Ada-specific syntax features.

Version 4.2 of Super PDL is priced from $14,000 to $30,000 depending on the host VAX model. The Ada-Super PDL option that includes Ada Code Generation, as well as the Ada language constructs, costs an additional $5,000.

Advanced Technologies International, 19th Floor, 350 Fifth Ave., New York, N.Y. 10118.

Tominy, Inc. has ported its **Mach 1** application system generation facility to the NCR Corp. Tower computer system running the Unix System V operating system.

Mach 1 is said to provide a software development environment for building user information systems. It consists of a full-function data base management system, screen definition facilities, print definition facilities, a systems query-language-based query/report writer, multiple programming language interfaces, automatic program generation facility and productivity language.

Mach 1 for the NCR Tower is priced from $2,500 to $28,000.

Tominy, Mach 1 Division, 4221 Malsbary Road, Cincinnati, Ohio 45242.

Application packages

Business Information Technologies has announced an integrated series of management tools for wholesalers and distributors called **The Distribution Expert**.

Designed to run on Digital Equipment Corp.'s Microvax, VAX and Micro-PDP/11 computers, the tools are said to include features such as an interactive quote module with deposit handling and automatic quote to order conversion. Other features include support for point-of-sale capabilities such as counter charge sales with on-

Continued on page 26

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Continued from page 25
line credit checking.

The product can be interfaced to integrated accounting and DEC's A-to-Z productivity software.

The Distribution Expert costs $24,000.

Business Information Technologies, P.O. Box 426, Burlington, Vt. 05402.

Outlook Software, Inc. has announced **Version II** of its **Outlook/36** financial modeling system to be used with the IBM System/36.

Outlook/36 is said to be a full-function modeling package designed to integrate directly with the System/36's data files.

Version II eliminates the need for any programming in transferring data from System/36 files to models.

The system prompts the user for necessary data and then automatically generates a Report Program Generator program that will transfer the data from the file to the model, the vendor said.

Version II of the Outlook/36 package costs $2,495 per license.

Outlook Software, Suite 117, One Woodfield Lake, Schaumburg, Ill. 60195.

Utilities

VIPS, Inc. has announced the **Survival Check System**, a utility check processing software product designed to allow banks to process checks on another bank's check processing equipment.

Processing is controlled via a file containing parameters, sort patterns and edit criteria that is separately testable and maintainable.

The IBM 3890-based system is said to be portable, allowing movement of the check-processing function from one operation site to another.

The Survival Check System costs $27,500.

VIPS, 54 Scott Adam Road, Hunt Valley, Md. 21030.

Alcyon Corp. has announced a version of its **C68 cross-compiler** for Unisoft Systems' Uniplus hosts and **Versatarget**, a C68 option said to provide support for cross-development to Versados target environments.

Versatarget functions under Motorola, Inc.'s Versados target environments. It includes Versados runtime libraries for the host system, plus a set of utilites that allow the users to download the C68 executable object modules from the hot system to the Versados target system.

Versatarget costs $500 for the IBM Personal Computer and $1,000 for all other hosts. The Uniplus version of C68 costs $1,495 for Motorola 68000/68010 development and $2,295 for 68020/68881 development.

Alcyon, 5010 Shoreham Place, San Diego, Calif. 92122.

Carleton Corp. has announced an enhanced version of its **CQS IDMS Data Base Interface** for the IBM mainframe marketplace.

The enhanced product is said to allow users to access Cullinet Software, Inc.'s Integrated Data Base Management System (IDMS) files using an IDMS data management language (DML) command subset incorporated into the CQS command language. Users can upgrade existing data retrieval tools and access IDMS data files using Carleton's CQS System that incorporates IDMS DML command syntax. In addition, the CQS System and Data Base Interface permit users to a cess multiple data bases and any combination of data base and non-data base files within the same program.

The program costs $7,000.

Carleton, 245 First St., Cambridge, Mass. 02142.

Datacube, Inc. has introduced **Maxware**, a software support package for its Maxvideo system.

Maxware is provided as a C language source code. It includes an installation guide, a library of primitive functions and Maxvideo hardware diagnostics.

Maxvideo is a family of Motorola, Inc. VMEbus-compatible real-time image and digital signal-processing modules.

Maxware costs $1,000 for Sun Microsystems, Inc.-based systems.

Datacube, Four Dearborn Road, Peabody, Mass. 01960.

Training software

Advanced Systems, Inc. has announced **SAS/FSP**, **SAS/Graph** and **SAS/ETS**, three courses for SAS Institute, Inc. users.

SAS/FSP is said to teach the basic skills for using the SAS/Full Screen Product, a language that facilitates screens for large volumes of data input. SAS/Graph teaches the basic skills needed to employ SAS/Graph, a three-dimensional, color graphics software package. SAS/ETS teaches time-series modeling and forecasting, financial reporting and systems modeling.

Each course may be rented for $50 to $150 per module per month.

Advanced Systems, 155 E. Algonquin Road, Arlington Heights, Ill. 60005.

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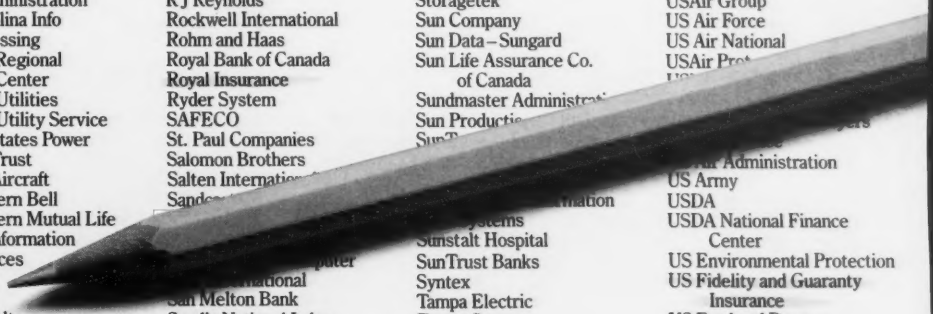

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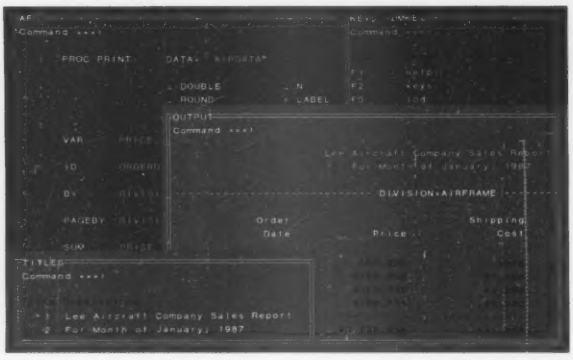

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NOTE: Remote submit commencing.
NOTE: DOWNLOAD IN PROGRESS FROM DATA.ACCT.MONTHLY TO OUT.PC.MON
NOTE: The data set PC.MON has 500 observations and 55 variables.
Data Sets Available for Download
DATA SET
DESCRIPTION
MONTHLY
Monthly general ledger balances after last close

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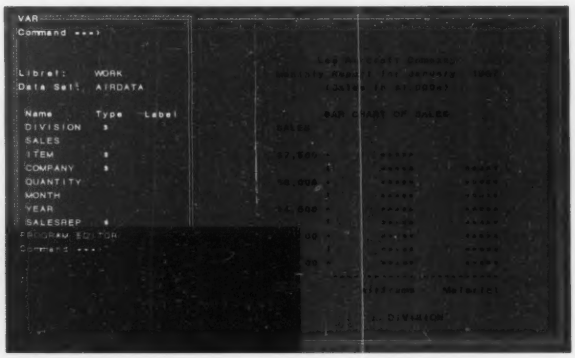

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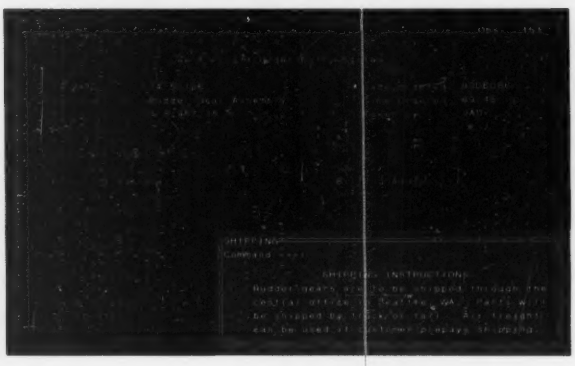

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MICROCOMPUTING

SMALL TALK

William Zachmann

Bridge tool is a winner

Examining the dozens of microcomputer hardware and software products each year can leave you a bit jaded. But once in a while, simply hearing a new product described is enough to convince you that it is a likely winner.

The Brooklyn Bridge from White Crane Systems in Norcross, Ga., is such a product. It meets a basic need for the growing number of users of laptop computers with 3½-in. disks.

The first thing you discover after becoming the proud owner of a laptop with 3½-in. hard-shell floppy drives is that a way is needed to get back and forth between it and the 5¼-in. personal computers you probably already have. Without some such pathway, you cannot use the software you've already got. Nor can data be exchanged with older systems.

Of course, you could buy a 3½-in. drive for your desktop system or an external 5¼-in. drive to attach to the laptop.

Continued on page 35

SQL DBMS distributes net data

BY DOUGLAS BARNEY
CW STAFF

MENLO PARK, Calif. — Gupta Technologies, Inc. recently announced SQLBase Version 3.1, a microcomputer-based package that runs under Microsoft Corp.'s Windows operating environment.

According to Umang Gupta, president of Gupta Technologies, SQLBase is the first SQL-based data base package to take advantage of the Windows graphical user interface.

The package offers support for distributed data base queries and updates and is optimized to run on most popular local-area networks (LAN). The package is currently available.

SQLBase is positioned several ways, according to Gupta. The package can be used for stand-alone applications development, provide a data base server for personal computers or serve as a gateway for data base management systems running on mainframe computers.

SQLBase consists of a data base engine along with programs that route data between applications nodes and data base server nodes.

Gupta's implementation of SQL is identical to that of IBM mainframe-based SQL/DS and DB2 in language syntax and facilities, the firm claimed.

By using the applications program interface, SQL statements can reportedly be embedded in C programs.

Although SQLBase runs under Windows, the user does not have to purchase the full Windows package in order to run the product.

The multiuser version of SQLBase sells for $1,995, and the single-user version sells for $995.

For data base server nodes, the package requires an IBM Personal Computer AT or compatible with 640K bytes of random-access memory (RAM), a hard disk and IBM PC-DOS or Microsoft MS-DOS 3.1. For applications nodes, the package requires an IBM PC or compatible with at least 512K bytes of RAM. No hard disk is required.

The package runs on all Netbios-compatible networks, including IBM's Token-Ring and PC Network and Novell, Inc. and 3Com Corp. LANs.

Wordperfect ports programs to IBM, DEC architectures

BY PEGGY WATT
CW STAFF

OREM, Utah — Wordperfect Corp. is returning to its roots in the large systems world and will port its established word processing program to several architectures, including IBM's VM environment and Digital Equipment Corp.'s VAX minicomputers. Wordperfect originally marketed word processing software that ran on Data General Corp. minicomputers.

A key aspect of the firm's strategy is to provide file compatibility among the several versions of Wordperfect, according to Dan Lunt, vice-president of marketing for Wordperfect.

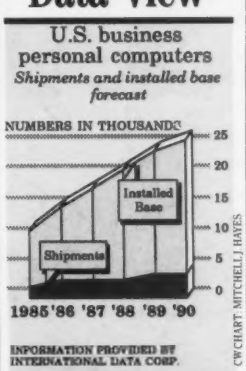
The system's hardware roll call currently includes the IBM 4361 and Personal Computer, Apple Computer, Inc.'s Apple II and DG's Eclipse minicomputers, as well as unreleased versions for Unix-based micro- and minicomputers, DEC's VAX, the Apple Macintosh, the Atari

Continued on page 35

Data View

U.S. business personal computers

Shipments and installed base forecast



Game firms entering new realm

BY STEPHEN BANKER
SPECIAL TO CW

Commodore International Ltd. and Atari Corp. have more in common than their association with the mercurial Jack Tramiel, the 58-year-old entrepreneur who founded the first and now heads the other. They are, for example, the leaders — though the order is in dispute — in the number of computers sold worldwide. But both firms' early distribution was in home and game machines, a reputation the companies are now seeking to modify.

Both have also recently broken back into black ink after periods of massive financial losses, and success in both cases has been spurred by powerful, aggressively priced microcomputers — the Commodore Amiga and the Atari ST — driven by the Motorola, Inc. 68000 chip.

Having demonstrated new energy and viability as computer manufacturers, both are now seeking a share of the most dynamic and lucrative part of the industry, the business sector.

As part of that strategy, and in response to IBM's intentions of vacating the commodity side of the industry, they have added inexpensive IBM Personal Computer clones to their lines. Commodore's basic offering goes for

Continued on page 38

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CONTINUED FROM PAGE 31

This, however, can easily be a $500 or $600 proposition.

Alternatively, you can use modem communications. That requires that both your laptop and desktop system have modems and communications software.

Furthermore, the product isn't just to link laptops with desktop systems but can be used between two desktops as well. In this manner, it serves as a kind of poor man's local-area network connecting two systems.

In fact, although it is a little tricky, it can actually be set up so that each system will have access to all the devices on the other.

Either system may act as the master system. Typically, you would use the desktop as the master and the portable as a server. In this case, were you to have an IBM Personal Computer AT with two floppy drives and a 30M-byte Winchester disk, the floppy drives on the laptop would look like D: and E: drives at the AT.

To get software onto the laptop, simply copy the relevant files from the floppy or hard disk drive on the AT to the virtual disks, which are actually on the laptop system. Similarly, you might copy your appointment calendar file from the laptop drives onto the desktop system to update it.

The Brooklyn Bridge software also allows access to other resources such as printers, the system clock and random-access memory disks. In practice, however, the ability to access the disks of the other system will be the most useful feature. In the first place, the ability to transfer disk files makes it unnecessary to share most other devices. Rather than access a printer over the Brooklyn Bridge, for example, it is just as easy to transfer the print file disk to disk and then print it on the desktop system with a printer attached.

Second, there are some limitations on the use of peripherals on the server system over the Brooklyn Bridge. Software that is not well behaved and does not work through the standard Microsoft Corp. MS-DOS device drivers won't work over the link. Therefore, using a modem over the Brooklyn Bridge really doesn't work, because communications software normally bypasses the device drivers.

The Brooklyn Bridge, priced at $129.95, provides an easy, convenient and versatile way to bridge between your laptop and desktop. It consists of an 8-ft. cable and software on two disks — one 3½-in. and one 5¼-in. — for the two systems.

In operation, the Brooklyn Bridge allows access to disks and other resources on one system as if they were part of the second.

Zachmann is vice-president of research at International Data Corp.

Wordperfect

CONTINUED FROM PAGE 31

Corp. Atari ST and the Commodore Amiga.

Under consideration are versions for Sun Microsystems, Inc. and Apollo Computer, Inc. workstations and the AT&T 3B line, according to Alan C. Ashton, Wordperfect president. "We found that users wanted compatibility across systems," he said. "We're trying to make conversions transparent and ideal for a network."

Wordperfect for IBM VM environments is still a year away, Ashton said. The VAX version, however, was formally announced recently and will ship this month. The Macintosh version is promised by April and will be priced at $395; a Unix version will be out by fall, Ashton said.

Even the large system implementations will retain the standard Wordperfect interface, Ashton added. The exceptions are the Motorola, Inc. 68000-based systems, such as Macintosh and Atari ST, that have their own distinctions.

Wordperfect's planned universal implementation was greeted with approval by users, even if they had no immediate plans to change hardware. "This is probably not a big announcement to us, but it keeps some doors open," said Mark Doramus, factory MIS manager at Ore-Ida Foods Co. in Ontario, Ore. He runs Wordperfect on the DG systems that were the program's original implementation.

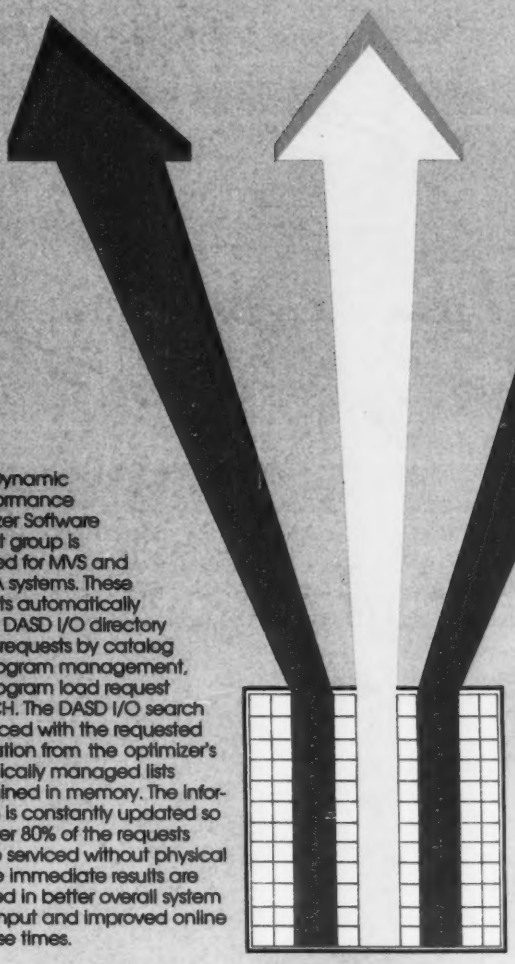
A microcomputer manager at a California defense industry corporation said he is intrigued to see the new implementations. "I believe in the power of the PC. I'm not in favor of doing word processing over a 2,400 bit/sec. modem," he said. Wordperfect now runs on more than 200 IBM PCs and compatibles and is being implemented on several networks under the manager's direction.

Wordperfect President Ashton said the firm will target IBM's Displaywrite, especially with the newest version's Document Content Architecture conversion capabilities. He said he plans to underprice IBM's mainframe editors and price the VAX versions to tackle high-end competition.

Ashton said the company just finished its most successful year, with $52 million in sales, which was more than double the $23 million of 1985.

Wordperfect now has more than 300 employees, approximately 80 of them on development teams for the numerous implementations of the flagship product.

Improve Online System Response Times and Reduce DASD I/O



The Dynamic Performance Optimizer Software product group is designed for MVS and MVS/XA systems. These products automatically reduce DASD I/O directory search requests by catalog and program management, and program load request by FETCH. The DASD I/O search is replaced with the requested information from the optimizer's dynamically managed lists maintained in memory. The information is constantly updated so that over 80% of the requests can be serviced without physical I/O. The immediate results are reflected in better overall system throughput and improved online response times.

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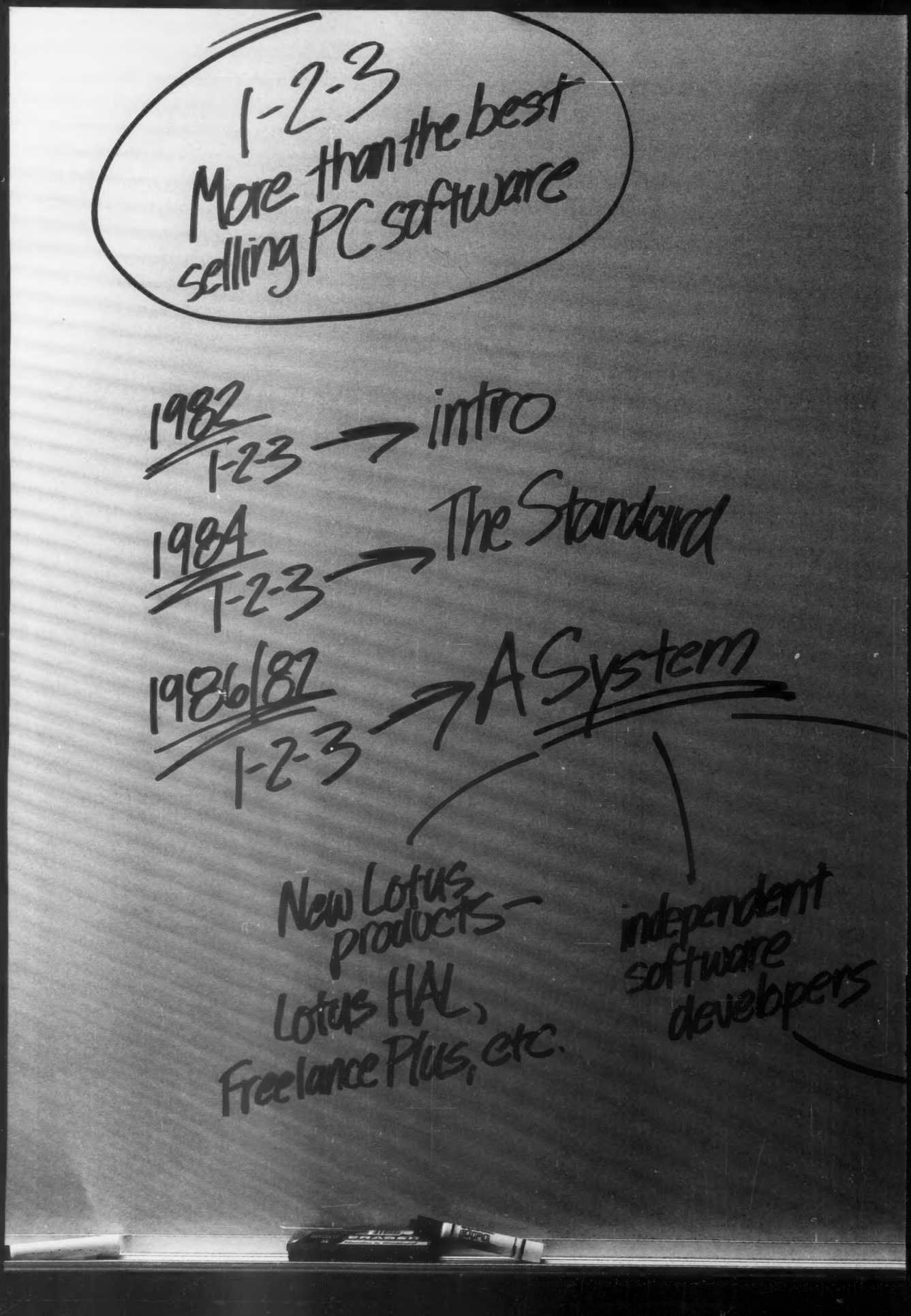
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Game firms

CONTINUED FROM PAGE 31

$1,000; Atari's costs half that. However, the machines' configurations are different. This element was emphasized last month when Atari President Sam Tramiel, son of Atari Chairman Jack Tramiel, trumpeted the IBM PC clones as portending "war on the computer industry."

"I think the Atari PC will have a dramatic influence on our ability to sell into the Fortune 1,000," says Richard Frick of Atari's newly formed Corporate OEM Sales Group.

According to Frick, Atari programmers have written software to emulate the most popular terminals. "People are spending the same amount or more for a dumb terminal," he says, "when they actually could be buying not only a terminal but a computer."

Frick says he expects to see positive results by the middle of this year. "We're getting our foot into the door in large corporations," he reports, "and into systems houses, vertical marketplaces and value-added resellers."

Commodore, meanwhile, is less hopeful of an immediate breakthrough in the top U.S. corporations. "We're very strongly interested in the business market," says Clive Smith, vice-president for corporate planning and development, "but the corporate market is the furthest away."

Smith notes some success in Europe, particularly in Germany (which is also Atari's most active overseas sales area), where Commodore has placed its clones in some 200 large companies. Nonetheless, Smith says the U.S. game plan starts with "professional use in the home, small businesses, vertical markets and then corporate."

And Smith concedes that the Amiga is not perceived as, nor was meant to be, a spreadsheet or data base machine. "It's on the cutting edge of graphics and sound," he says.

One reason for the appearance of the two new IBM PC clones is the reluctance of the largest software houses to write for Atari and Commodore hardware. Current estimates show there are some 300,000 STs in use, while there are nearly 100,000 Amigas in use worldwide. That has not been enough to activate either Ashton-Tate or Lotus Development Corp., particularly since no more than half of those figures pertain to English-speaking countries.

But the lack of support from major software vendors may not spell doom for the machines. Fully enabled versions of a powerful word processor, Wordperfect from Wordperfect Corp., are expected in the next few months, and software clones of Lotus's 1-2-3 and Ashton-Tate's Dbase III are already running on both the Amiga and the ST.

In the burgeoning field of desktop publishing, Atari recently unveiled an inexpensive laser printer, priced at less than $1,500, which may spur third-party developers to create a page description language equivalent to Postscript from Adobe Systems, Inc., currently the standard for the Apple Computer, Inc.'s laser printer.

Much of the firms' future success depends on how value-added resellers and corporate buyers react to the clones. But new products based on both the Intel Corp. and Motorola chips are waiting in the wings. Commodore will show a more powerful Amiga with an IBM interface in the next month or two, and Atari, having introduced a Mega ST with up to 4M bytes of random-access memory, is planning its own versions of all the IBM-compatible micros, up to and including ones based on the Intel 80386.

So both companies, having survived the turmoil in the "toy" computer market, are headed for the business community and demanding respect. "The corporate market," says Atari Vice-President Leonard Tramiel — another son of the chairman — "is essential, because it affects people's view of what is an important computer."

Banker is a former columnist for *Popular Computing* and reports for the Canadian Broadcasting Corp.

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Text retrieval tool debuts

COLLEGE PARK, Md. — Airs, Inc., a firm specializing in text retrieval software for large data bases and archives, recently unveiled a version of its high-end Marcon software for use with optical disks.

The Marcon text management software runs on the IBM Personal Computer AT and compatibles with 640K bytes of random-access memory and can be used with a hard disk or an optical disk. It costs $1,495.

W. Theodore Durr, president of Airs, said in an interview that the Marcon software is well suited for the new generation of micros using Intel Corp.'s 80386 chip as well as the yet-to-be-released Microsoft Corp. MS-DOS 5.0 operating system. "People say that few applications need the speed of the 386, but our software does," Durr said. Marcon provides full text retrieval for 30M bytes of data on hard disks or 500M bytes on optical disks, the vendor said.

According to Airs, the product uses menus for all operations and features a pop-up window that allows the user to browse through the data base and select terms to be included in a relational search.

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December 1986

NEW PRODUCTS

Systems

Telex Communications, Inc. has announced **Magnabyte**, a computer-image projection system.

Magnabyte allows users to share a depiction of any text or graphic viewed on a personal computer display screen with large groups of viewers. It consists of a translucent LCD palette that fits on the top of any standard overhead projector, an interface card for the host PC and a handheld remote control.

The system is compatible with Telex's Intelligent Workstation Series, the IBM Personal Computer family and the Apple Computer, Inc. Apple II family.

Magnabyte is priced at about $1,200.

Telex Communications, 6422 E. 41st St., Tulsa, Okla. 74135.

Tatung Co. of America, Inc. has announced its **Model TCS-7000** IBM Personal Computer AT compatible.

The system offers 64K bytes of read-only memory and 512K bytes of random-access memory, expandable to 1M byte on the system's main board. It operates on Microsoft Corp.'s MS-DOS 3.2 and comes with a system board, hard-disk controller card, floppy disk controller card, one floppy disk drive, keyboard, switching power supply and battery back-up.

The 6- and 10-MHz mode-switchable version costs $2,395, and the 6- and 8-MHz version costs $2,195.

Tatung, 2850 El Presidio St., Long Beach, Calif. 90810.

Peripherals

N/Hance Systems, a division of Symphony Systems, Inc., has introduced its **N/Hance 524 optical-disk reader system** said to allow personal computer users to read data stored on N/Hance 5¼-in. optical disks.

The 524 reader was designed for applications in which the information on optical disks is accessed but not updated. The system includes the drive, an interface and N/Hance's IBM PC-DOS-based Text-Scan document management and text retrieval software. It can be used with IBM Personal Computers, PC XTs, ATs and compatibles.

The 524 optical-disk reader system is priced at $2,995.

N/Hance Systems, 908R Providence Highway, Dedham, Mass. 02026.

Kimtron Corp. has announced the **KT-7/PC Kix**, a personal computer terminal designed to work with Santa Cruz Operation, Inc.'s Xenix System V operating system on IBM Personal Computer ATs, XTs and compatibles.

The terminal is said to suport all escape and command code sequences called for in Xenix. It offers a one-page standard display memory; 14-in. diagonal green or amber screen; two RS-232C serial ports; and IBM PC, ASCII and graphics character sets.

The KT-7/PC Kix costs $695.

Kimtron, Building 380, 1709 Junction Court, San Jose, Calif. 95112.

Data storage

Microsparc, Inc. has announced **The Speed Disk System**, software said to create simulated disk drives in Apple Computer, Inc. Macintosh memory.

Speed Disk works with applications such as Apple's Macwrite and Microsoft Corp.'s Excel, allowing users to configure the applications for use with Speed Disk. The Speed Disk System is said to follow the Macintosh user interface. Options allow the user to save a Speed Disk in packed format or configure it to automatically boot a start-up application.

The Speed Disk System is priced at $29.95.

Microsparc, 45 Winthrop St., Concord, Mass. 01742.

Board-level devices

Quadram Corp. has announced the **QuadEMS+ AT**, an expanded memory board for the IBM Personal Computer AT.

The board is said to be software switchable between AST Research/Quadram/Ashton-Tate Enhanced Expanded Memory Specification and the Lotus/Intel/Microsoft Expanded Memory Specification.

QuadEMS+ AT is said to utilize single in-line memory module memory.

QuadEMS+ AT costs $645 for 512K bytes and $1,395 for 3M bytes.

Quadram, One Quad Way, Norcross, Ga. 30093.

Maynard Electronics has announced **Surprise 286**, an Intel Corp. 80286-based turbo board for the IBM Personal Computer.

Surprise 286 is said to increase the clock speed of the PC from 4.77 MHz to 7.2 MHz. Surprise 286 includes a socket on the board for either a 5- or 8-MHz version of the 80287 math coprocessor. The card has 8K bytes of cache memory.

The board runs in three different speeds, turning the cache memory on and off and standard 8088 mode. Surprise 286 is also compatible with Enhanced Graphics Adapter, Extended Memory Specifications and Direct Memory Access.

Surprise 286 costs $599.

Maynard Electronics, 460 E. Semoran Blvd., Cassleberry, Fla. 32707.

"We picked Word not fancy formatting, but and easy training are there's very little

Mike Macewich, Senior Decision Support Consultant, The Quaker Oats Company.

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Microsoft is a registered trademark of Microsoft Corporation. Apple is a registered trademark and Macintosh is a trademark of Apple Computer, Inc. IBM is a registered trademark of International Business Machines Corporation.

Computer Peripherals, Inc. has announced the **Overachiever Plus** multifunction enhancement board for the IBM Personal Computer XT and AT.

The board was designed to accommodate Microsoft Corp.'s Xenix, AT&T's Unix and other multiuser systems software applications. It features switch-selectable speeds from 4.77 to 8 MHz. It has 1.5M bytes of memory, which is expandable to 3M bytes.

The enhancement board is also compatible with both 8- and 16-bit modes.

The Overachiever Plus is priced at $54, which includes flip-up software for office functions and a utility software package.

Computer Peripherals, 2635 Lavery Court, Newbury Park, Calif. 91320.

Virtual Microsystems, Inc. has announced the **Q-bus version** of its **AT/Bridge**.

The Q-bus version of the AT/Bridge is said to allow users of Digital Equipment Corp. VAX and Microvax systems to run IBM Personal Computer AT application software directly from any computer terminal.

In addition, PC peripheral hardware can be attached to an expansion cabinet that connects to the Microvax.

The AT/Bridge Q-bus version is priced at $3,990.

The optional PC bus expansion cabinet is priced at $2,990.

Virtual Microsystems, Suite 300, 2150 Shattuck Ave., Berkeley, Calif. 94704.

Applications packages

Timekeeping Systems, Inc. has announced **Dbarcode**, a software program that uses Ashton-Tate's Dbase III Plus to print Code 3 of 9.

The program prints bar codes with descriptions or multiple columns of bar codes across a page. It permits adjustment of bar and space widths to suit various bar code readers and provides for variable bar code height and vertical spacing.

Dbarcode requires an IBM Personal Computer or compatible and an IBM Graphics-compatible printer. It costs $99.

Timekeeping Systems, 12434 Cedar Road, Cleveland, Ohio 44106.

Software languages

STSC, Inc. has ported its **APL Plus System** to the Apple Computer, Inc. Macintosh computer.

The APL Plus System for the Macintosh is a full-feature APL language interpreter. It is compatible with the vendor's APL Plus System for IBM Personal Computers, allowing users with existing applications to convert them to run on the Macintosh.

Features include memory expandable to 4M bytes, a library of tutorial and utility software, built-in terminal emulation, file-transfer facilities and upload and download capabilities.

APL Plus for the Macintosh costs $395.

STSC, 2115 E. Jefferson St., Rockville, Md. 20852.

Software utilities

Data Access Corp. has announced **Flex Tools**, a developer's tool kit for its Dataflex relational data base development system.

Included in the tool kit are utilities such as Flexhelp, on-line programmer's reference guide; Flexchange, providing the ability to change file definitions automatically; Strip, with the ability to remove all comments and blank lines and to left-justify all lines of source code; Relocate, which allows users to relocate data and files to new drives; Ftxref, a cross-reference utility; Ftxref2, allowing users to find source files containing specific file, field or index references; and a menu environment allowing users to define up to 24 selections per menu.

Flex Tools costs $195.

Data Access, 8525 S.W. 129th Terrace, Miami, Fla. 33156.

Computervision Corp. has announced **Personal IGES**, an Intitial Graphic Exchange Specification (IGES) package designed for its personal computer-based products.

The package is said to facilitate the communication of drawings and geometrix product information between data bases.

It defines a common data base format for exchanging computer-aided design/computer-aided manufacturing (CAD/CAM) data between Personal Systems graphics programs and other CAD/CAM packages.

Once converted to IGES format, information originally constructed with a Personal systems package can be passed to other CAD/CAM systems, according to the vendor.

The Personal IGES package is priced at $1,300.

Computervision, 100 Crosby Drive, Bedford, Mass. 01730.

Binary Research, Inc. has announced **Q-2C**, a system said to translate all executable fourth-generation language data base Q-Pro 4 to C language.

Q-2C produces readable C code that may be edited, compiled and linked as usual.

It is available for IBM PC-DOS and Microsoft Corp. MS-DOS and is compatible with the Lattice, Inc. C compiler.

Q-2C is priced at $1,000.

Binary Research, 7100 E. Valley Green Rd., Fort Washington, Pa. 19034.

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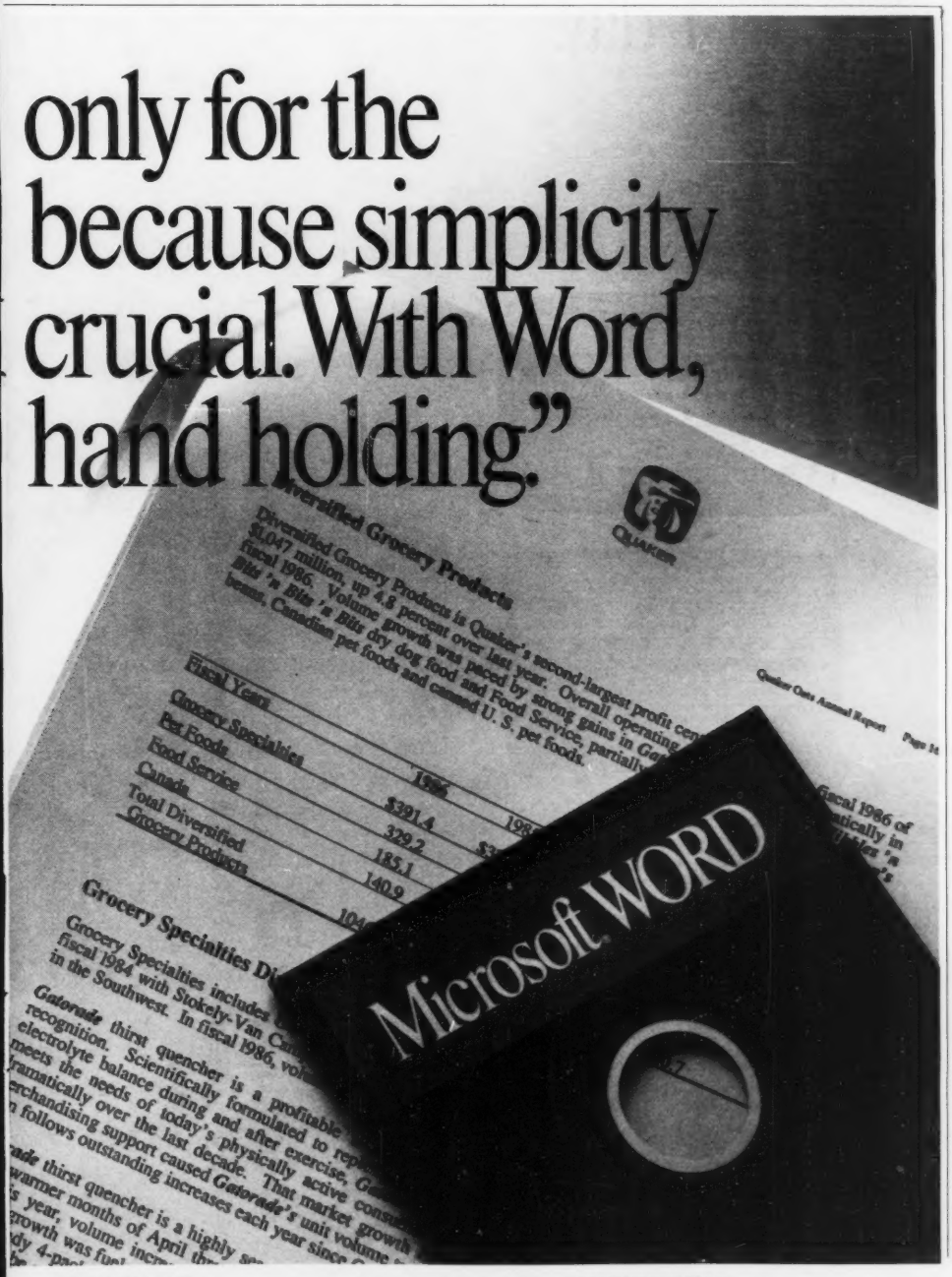

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PROCEDURE DIVISION.

000-SWITCH-SECTION.

    MOVE DFHCOMMAREA TO NEXT-TASK.
    IF NEXT-TASK = 'S' PERFORM 100-SEND-SCREEN.
    IF NEXT-TASK = 'R' PERFORM 200-RECEIVE-SCREEN.

    .
    .
    .

100-SEND-SCREEN.
    EXEC CICS HANDLE CONDITION MAPFAIL(MENU)
        ERRORS(ERRORS) END-EXEC.
    MOVE 'R' TO NEXT-TASK.
```

```
    EXEC CICS WRITE TSQ FROM(CAR-REC)
        RIDFIELD(CAR-ID) END-EXEC.
    EXEC CICS SEND MAP('CAR-PNL')
        MAPSET('PRODSET') END-EXEC.
    EXEC CICS RETURN TRANSID('CAR1')
        COMMAREA(NEXT-TASK) LENGTH(1) END-EXEC.

200-RECEIVE-SCREEN.

    EXEC CICS HANDLE AID ANYKEY(300-MAIN-LOGIC)
        END-EXEC.
    EXEC CICS RECEIVE MAP('CAR-PNL') MAPSET('PRODSET')
        INTO(KEY-MAP) END-EXEC.
```

With COBOL/XE. *A pseudo-conversational task coded in COBOL/XE. COBOL/XE automatically performs the functions necessary for pseudo-conversational CICS execution simply by using the verbs DISPLAY and ACCEPT. Complex CICS code is unnecessary, and efficient execution is ensured.*

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DISPLAY CAR-PNL.
ACCEPT CAR-PNL.
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NETWORKING

DATA STREAM

Elisabeth Horwitt

Unix won't wait for OSI

Let's face it, a lot of users want multivendor networking *now*, not several years hence, when the Open Systems Interconnect (OSI) communications standard finally reaches maturity. For them, the ground swell of support for Network File System (NFS) and Transmission Control Protocol/Internet Protocol (TCP/IP), as evidenced at Uniforum 1987, The International Conference of Unix Users, is plain good news — at least in the short run. However, users who choose to enjoy multivendor networking now may pay later, when it comes time to migrate to OSI protocols.

NFS is a distributed file system developed by Sun Microsystems, Inc.; TCP/IP is a set of basic networking protocols originally developed for the Department of Defense. Unlike OSI, both protocols specify a full set of networking functions and have been tested as commercial products at user sites.

At Uniforum, vendor support for both NFS and TCP/IP was clearly reaching the critical mass needed to generate a de facto industry standard. NFS gained support from AT&T, despite the fact that AT&T has

Continued on page 45

Convergent networks Unix

BY ELISABETH HORWITT
CW STAFF

SAN JOSE, Calif. — PC Exchange, a software package recently introduced by Convergent Technologies, Inc., enables Microsoft Corp. MS-DOS workstations to access files on Convergent's Unix-based servers over a variety of local and long-distance media.

Convergent also announced CTIX 6.0, a complete version of AT&T's Unix System V Release 3 that supports several networking environments; Multi-Processor Communications Controller, an intelligent I/O processor board that allows high-speed multiprotocol communications; and Telecluster, which implements the Convergent Cluster local-area network on twisted-pair wiring.

Based on the Virtual Network System from Banyan Systems, Inc., PC Exchange allows IBM Personal Computer users to share files, peripherals and services such as electronic mail and X.25 and IBM host gateways on multiple Convergent Workgroup Servers. Workgroup Servers, typically linked to PCs in star configurations, can now be networked together over local- or wide-area communication links to form divisional or corporatewide multiserver networks, according to Convergent.

PCs can be connected to Workgroup Servers with standard thin-wire Ethernet, RS-232C asynchronous lines, the

Continued on page 44

PC Xpander integrates PC, VAX

BY PATRICIA KEEFE
CW STAFF

CONCORD, Mass. — The PC Xpander, recently introduced by Xyplex, Inc., provides IBM Personal Computer users with access to Digital Equipment Corp.'s VAX computers, including VMS applications.

The hardware and software product converts the IBM PC and VAX into coprocessing partners, according to Xyplex. It is available as an option for the Xyplex Distributed Network Processing System, which off-loads PC-to-VAX communications tasks from the VAX, preventing potential host overload.

The Xyplex system acts as a front-end processor, off-loading VAX I/O-intensive network processing tasks such as character echo and message formatting.

PC Xpander provides terminal emulation and PC access to VAX disk drives and storage devices, according to Scott Wieder, Xyplex product manager.

But Xpander provides PC and VAX users with direct file access to the same files, he said. The software for Vaxmate creates a virtual drive, requiring users to take an extra step in order to ac-

Continued on page 44

AT&T to expand digital net worldwide

BY ELISABETH HORWITT
CW STAFF

NEW YORK — Determined to outdistance its competition in the digital networking race, AT&T announced plans to spend $2.5 billion this year and a comparable amount in both 1988 and 1989 on expansion of digital networking facilities worldwide.

By the end of 1989, AT&T's digital communications systems will link 350 major U.S. cities, key points in Europe and Japan and locations in the Far East and Caribbean, the company said. AT&T's digital network currently links 215 cities in the U.S.

At a press conference, Roy Blount, president of AT&T's Network Operations Group, outlined goals for which the above funding will be allocated during the next three years. He said AT&T will have in place by the end of the year 103 AT&T No. 4 ESS digital switches, replacing some 300 analog switches around the country. As a result, 98% of all calls will be switched digitally by the end of this year; AT&T's goal for the next three years, Blount said, is to achieve 100% digital switching.

AT&T plans to increase its fiber-optic network's route miles from 11,000 miles currently in place to 24,000 miles by 1989.

The company hopes that by upgrading its network on such a massive scale, it will outdistance its major rivals, U.S. Sprint Communications Co. and MCI Corp., which are also racing to imple-

Continued on page 45

Apple linked

Third parties add value to Appletalk

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — In the wake of Apple Computer, Inc.'s increasing emphasis on communications, a slew of third-party vendors announced Apple networking products at last week's Seybold Conference on Desktop Communications.

Kinetics, Inc. in Walnut Creek, Calif., extended its Fastpath product line to include Fastpath 3, an Appletalk-to-thin Ethernet gateway. The thin Ethernet version of the IEEE 802.3 standard uses thinner, less expensive coaxial cable. Because the cable carries signals over shorter distances without repeaters, thin Ethernet is designed for single-floor work-area networks.

Fastpath 3 enables Apple Macintosh and Laserwriter products to communicate over a thin Ethernet medium, using either Appletalk or Transmission Control Protocol/Internet Protocol (TCP/IP) networking software. The product also supports Apple's Communications Framework protocols.

Linking Appletalk to Ethernet, Fastpath 3 allows Macintosh users to access host computers, such as VMS- or Unix-based minicomputers, or an IBM Personal Computer. Fastpath 3 also allows use of Ethernet as a high-speed backbone linking multiple Appletalks.

Kinetics also demonstrated its new Ether SC, a small computer systems interface (SCSI)-based Ethernet controller for the

Continued on page 45

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Convergent

FROM PAGE 43

cess files that have been generated on the VAX, Wieder said.

While Vaxmate is DEC's PC offering, PC Xpander addresses users who want to integrate their installed base of IBM PCs, PC XTs and ATs into a VAX environment, Wieder added. He said PC Xpander goes beyond Vaxmate in three areas: PC-to-VAX control, VAX-to-PC control and task-to-task communication and control.

PC-to-VAX control allows the PC to access VMS applications such as DEC's Vaxmail from Microsoft Corp.'s MS-DOS, using DOS commands. PC users can use the VAX to back up and store files using any printer connected to any VAX on the system.

VAX-to-PC control enables the VAX to interact with the PC. Data or applications can be downloaded from the VAX to the DOS-based PC programs, such as Lotus Development Corp.'s 1-2-3, on the PC.

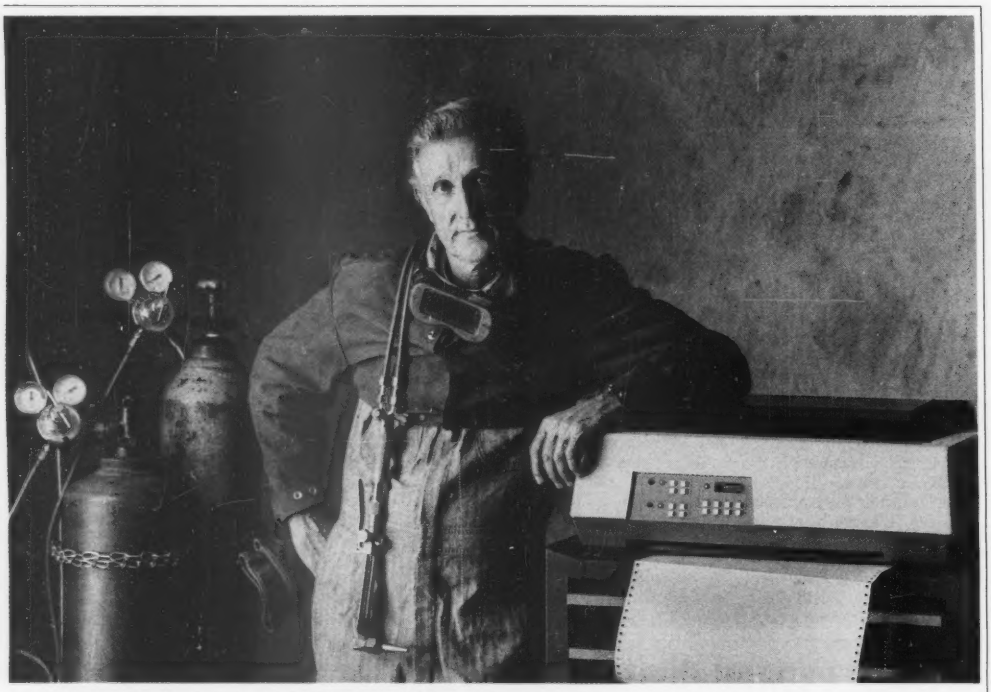
Remote communications

Users can run two sessions on the VAX and hot-key back to an application on the PC. In addition, PC-to-PC control makes it possible for local and remote PCs to communicate with each other.

PC Xpander software resides on the PC and the VAX. The PC software costs $375 for each IBM PC and requires 80K bytes of random-access memory. The VAX software ranges in price, depending on the host model, from $4,000 to $14,000.

Xyplex offers two types of hardware connectors linking PCs to the VAX. The Cluster Controller, priced at $2,475, is a terminal server that supports eight serial ports and has communications speeds of 9,600 bit/sec.

The internal PC Controller Card, which costs $695, permits faster communications speeds limited only by the IBM PC itself.



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Xpander

FROM PAGE 43

Convergent Cluster or Telecluster. The vendor plans to introduce a token-ring connection in a future release. PC Exchange will be available in the second quarter of this year.

CTIX 6.0, Convergent's implementation of Unix V.3, supports a wide range of networking environments through a Streams-compatible interface. Streams is a set of specifications for interfacing networking systems with the Unix V.3 operating system through AT&T's Transport Level Interface (TLI) and Transport Provider Interface.

CTIX 6.0 provides Streams-based support for AT&T's Remote File System and Sun Microsystems, Inc.'s Network File System — both distributed file systems — and Transmission Control Protocol/Internet Protocol. The advantage of TLI and Streams is that they isolate networking functions from the rest of the operating system, "So if an application is written for TLI, you can plug in any networking protocol without having to rewrite the application," product marketing manager Greg Powers says.

Telecluster is a combination of a Convergent Hub Interface installed at a wiring closet — or private-branch exchange — and data-over-voice adapters. It allows ordinary twisted-pair building wiring to support a voice channel and data transmissions at speeds of up to 1.8M bit/sec. across distances of up to 1,200 feet between workstation and wiring closet.

A hub supports four communications cards, each of which can link up to 23 IBM PCs or terminals with a Convergent S-Server. The cost for the combination is between $500 and $600 per user, depending on configuration.

The Multi-Protocol Communications Controller implements multiple communications protocols on Convergent's S/320 and S/640 departmental servers. A dedicated VMEbus-compatible I/O processor board supports up to 4M bit/sec. transmission. Initially, the Multi-Protocol Communications Controller supports bisynchronous IBM 3270, with X.25 and IBM Systems Network Architecture versions to follow.

Consumer Software to link users' LANS via MCI network

BY DONNA RAIMONDI
CW STAFF

GILROY, Calif. — Consumers Software, Inc. recently signed a contract with MCI Communications Corp. and released a gateway product that is intended to enable IBM Personal Computers on different types of local-area networks (LAN) to communicate via MCI's electronic mail service, MCI Mail.

The agreement should benefit medium-size and large corporations that have personal computer LANs, according to an MCI spokesman.

With the agreement and the new Network Courier/MCI Mail gateway, which is priced at $395, any number of remote LANs running the Network Courier can appear to the user as one LAN, according to Consumers Software.

The gateway allows PC users on a network to send electronic mail and DOS files to other LAN users via MCI Mail without leaving their current application program, the company claimed.

Will resell MCI Mail

Consumers Software will resell MCI Mail services as an extension to its Network Courier E-Mail package, which is priced at $995, for personal computer LANs.

The network can handle logical addresses for electronic mail distribution up to 500,000 registered MCI mail users, including subscribers who may not be running the Network Courier.

MCI Mail can be distributed in more than 40 countries, to 1.6 million telex terminals, or to worldwide locations through MCI's Print Mail hard copy delivery services.

Operates on Netbios LANs

The Network Courier/MCI Gateway operates on any LAN that supports the Netbios networking interface for Microsoft Corp. MS-DOS-based systems, including IBM's Token-Ring and PC Network and Novell, Inc.'s Netware operating system.

Applications written for Netbios, which are designed to access files and resources over a LAN, now have the ability to communicate between geographically separate LANs via the gateway and MCI Mail.

The gateway requires a minimum of 192K bytes of disk space on a network server and a Hayes Microcomputer Products, Inc.-compatible modem.

The gateway reserves 50K bytes of random-access memory so the user can access the network in background mode while running PC applications in the foreground.

Apple linked

CONTINUED FROM PAGE 43

Mac Plus unveiled at last month's Macworld show. Whereas Fastpath 3 links multiple Macintoshes tied to Appletalk — via the Mac's Appletalk port — to Ethernet, Ether SC links Macintoshes directly to Ethernet by connecting through the Mac's higher speed SCSI port. This provides a faster, although more expensive, connection. The unit features two SCSI ports so that it may participate in a chain of SCSI devices.

Available in March, Fastpath 3 will be priced at $2,750.

Tri-Data Corp. in Mountain View, Calif., announced a joint development project with Centram Systems West to provide IBM PC users with the same capabilities now available to Macintosh users under Tri-Data's Appletalk-to-IBM host gateway, the Netway 1000A Communications Server.

"We've been seeing a desire on the part of so many corporations to use the same LAN cabling system for their Macintoshes and IBM PCs," according to Alex Gernert, who is Netway's product manager.

File-transfer tool planned

Plans are to develop a product that will provide file transfer and IBM 3270 emulation capabilities to any IBM PC running Centram's Tops network software over Appletalk, Gernert said. The PC version of Netway 1000A is slated for availability in June.

Odesta Corp. in Northbrook, Ill., announced that its Multiuser Helix, Double Helix and Helix VMX software will support Apple's Appleshare and Appletalk networking software.

Multiuser Helix, a local-area network (LAN) shared-work environment, runs concurrently with Appleshare and can act as host for customized Helix applications on workstations networked through Appletalk.

Appleshare is also fully compatible with Double Helix, Odesta's applications generator and Helix VMX, Odesta's LAN-based multiuser applications environment that runs on the Digital Equipment Corp. VAX and uses Macintosh computers as intelligent workstations. Support of Apple's products by Odesta enables users to build departmental networking solutions in which Helix VMX, VAX and Appletalk systems act as application and peripheral servers for both Macintosh and Microsoft Corp. MS-DOS workstations, the company claimed.

Odesta also announced that Helix VMX will soon support MS-DOS, enabling IBM PCs to access DEC VAX/VMS host/data base servers. The PCs will be networked with Macintosh and VAX computers over Appletalk networks through Apple's new Appletalk PC Card. Through the use of Appletalk, workstations can communicate with VAX computers on Ethernet via a network bridge. Any application generated on a Macintosh using Double Helix will run on a VAX under Helix VMX.

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Unix won't wait

CONTINUED FROM PAGE 43

been pushing a distributed file system of its own, and from Apollo Computer, Inc., despite the fact that Apollo is one of Sun's chief competitors.

Communication Machinery Corp. unveiled software that implements TCP/IP on an IBM Personal Computer and supports software applications written for the Microsoft Corp. networking interface, Netbios. It is priced at $250. Informix Software, Inc. announced that its Unix-based distributed data base management system will now support TCP/IP as well as AT&T's Starlan network.

Convergent Technologies, Inc. announced an implementation of AT&T's Unix V.3 that supports NFS and TCP/IP. And both NFS and TCP/IP were used to link more than 150 computers from 44 exhibitors on a demonstration network at Uniforum that was implemented by Excelan, Inc.

The Uniforum prototype was also the first network to run OSI and TCP/IP concurrently, according to participant The Wollongong Group. Coexistence does not necessarily mean communications, however. Most transmissions over the network used either one protocol or the other, not both.

Admittedly, Excelan, Communication Machinery and Charles River Data Systems, Inc. all demonstrated OSI-to-TCP/IP gateways on the Uniforum network. However, those products do not resolve protocol incompatibilities of OSI and TCP/IP, but rather bypass them.

The gateways enable systems to communicate through programs written at the application level, which does not apply to TCP/IP at all. One disadvantage of conducting communications at the application layer of the OSI model is that transmissions must first pass through all six layers below the application level, slowing things down considerably.

"A lot of people are saying that TCP/IP makes a good stepping stone to OSI," says Charles River Data director of software development William Swee. "But the migration will be harder than they think, particularly when it comes to resolving addressing conflicts in an internetworking environment."

As OSI becomes a commercial reality, products providing true, transparent TCP/IP-to-OSI conversion will be desperately needed for the increasing number of users who must still communicate while straddling two sets of protocols.

AT&T to expand

CONTINUED FROM PAGE 43

ment fiber-optic cable and digital switches. "The bottom line is that we intend to remain profitable while all this is happening," AT&T spokesman James Byrnes said.

"When it takes this much in terms of capital expense to upgrade, you have to be pretty sure of recovering all that in business. AT&T can, but I'm calling into question whether other carriers can do the same," Byrnes continued.

The expanded digital and fiber-optic facilities will provide customers with higher quality and reliability in voice, data and video transmissions, according to AT&T. They will also form the basis for future AT&T services, such as wideband packet switching and Integrated Services Digital Network, the company said.

NEW PRODUCTS

Network Management

Tandem Computers, Inc. has announced a very large-scale integration-based communications controller for its Nonstop systems, called the **6106 Asynchronous Communications Controller.**

The controller is a single board microprocessor-based unit that is said to manage data communications between a Tandem computer and remote devices such as terminals and printers.

The unit supports 16 separately configurable communications lines that run asychronous, point-to-point protocols.

The 6106 Asynchronous Communications Controller is priced at $5,760.

Tandem Computers, 19333 Vallco Pkwy, Cupertino, Calif. 95014.

Customer premise equipment

AT&T has unveiled its **Fax 3530D** digital facsimile machine.

Features of the Fax 3530D include a built-in keypad; automatic dialing; the ability to store up to 28 letter-size pages of information for automatic distribution to up to 80 locations; document security; thermal printing technology; and sequential polling.

The 3530D is a CCITT Group 3 standard machine. It is priced at $4,495.

AT&T, 100 Southgate Pkwy., Morristown, N.J. 07920.

Links

Masscomp Co. has announced that users of its MC5000 family of supermicrocomputers will be able to access IBM hosts through **MSNA/3270**, a terminal-emulation software package from Systems Strategies, Inc.

The software allows MC5000s to access IBM hosts over a Systems Network Architecture/Synchronous Data Link Control network by emulating the IBM 3274 cluster controller. Terminals and printers connected to an MC5000 can communicate with the IBM host as IBM 3278 terminals and 3287 printers. Prices for the MSNA/3270 start at $5,000 for the software and $7,640 for a package that includes the software and a Systech Corp. DCP-8804 communications processor board.

Masscomp, One Technology Park, Westford, Mass. 01886.

Fox Research, Inc. has announced a **line of gateways** to IBM and compatible hosts for its 10-Net local-area networking system.

The gateway product line includes Systems Network Architecture and Binary Synchronous Communication gateways for stand-alone communications and 10-Net-to-mainframe communications.

The products consist of software and an intelligent board with a coprocessor for use on the gateway machine. Functions for the gateway are executed in the background.

Up to 32 logical sessions are available for concurrent use across the network.

The LAN-mainframe gateways cost $1,995 each. The stand-alone gateways cost from $795 to $1,095.

Fox Research, 7016 Corporate Way, Dayton, Ohio 45459.

Protocol converters

Develcon, Inc. has announced the **Model 717X Integral 3270** protocol converter.

The Model 717X is said to translate ASCII to Extended Binary Coded Decimal Interchange Code and control the selection of device types, transmission speed and parity. The unit is an integral Develnet resource, allowing any asynchronous ASCII device attached to the network to request and connect to it.

The Model 717X attaches remotely to an IBM 37X5 front-end processor at rates of up to 9.6K bit/sec. It is available with support for either 60 or 32 channels, full-duplex devices and ASCII to Systems Network Architecture/Synchronous Data Link Control or bisynchronous conversion.

The 16-channel model costs $5,000, and the 32-channel model costs $6,000.

Develcon, Suite E, 6701 Sierra Court, Dublin, Calif. 94568.

Electronic mail

Interactive Network Technologies, Inc. has introduced **Intermail**, an electronic mail system for Apple Computer, Inc. Macintosh users.

Intermail is composed of a central mail-server application and a desk accessory interface. It is said to allow both local and remote communication and file transfer.

Intermail requires any combination of Macintosh computers running current Apple system software in an Appletalk-compatible network. Features include multitasking server operation, multiple message types and zone support and password protection.

Intermail costs $299 for up to four users; $499 for five to 10 users; $749 for 11 to 20 users and $949 for more than 20 users.

Interactive Network Technologies, 20 Amy Circle, Waban, Mass. 02168.

Modems and multiplexers

A-O Electronics, Inc. has introduced the **GTX-100R**, an intelligent modem said to allow a remote caller to power a distant computer on or off.

The modem operates with personal computers and other systems powered via standard 115VAC power. It incorporates dial-back verification and password security, the vendor said.

The modem is Bell 212A compatible and features auto-dial and auto-answer capabilities.

The GTX-100R costs $895.

A-O Electronics, 2137 Flintstone Drive, Tucker, Ga. 30084.

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Students review lesson content with workbook exercises, and each module builds practical programming experience with sample programs provided on the C Video Workdisk. The package includes the acclaimed text "Learning to Program in C" by Dr. Thomas Plum, international authority on C and technical advisor to Hands On Learning.

The Secret: Roeder and his company have helped thousands to master computers and software. The secret of their system is its focus on people: using human experience to teach technical concepts. "It's like learning by osmosis" says one student, "I had no idea I was getting so much. When the tapes ended, I just started programming."

The All Hands On C Video Workshop is available in VHS or Beta at $995, and other formats at additional charge. We are sure you will find it an exceptional value. However, if you are not fully satisfied, return it for a full refund for up to 30 days. To order, or for more information, please call us or send this coupon with your business card or letterhead. Thank you.

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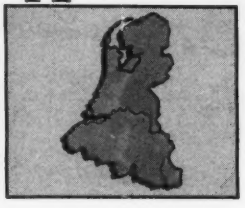

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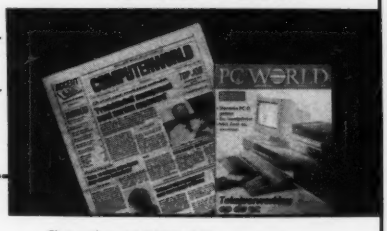

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VIEW POINT

James Connolly

The Wang bandwagon

The recent fortunes and misfortunes of Wang Laboratories, Inc. make one wonder what it takes to offend some people — in particular, computer industry analysts, consultants and journalists who, as a group, have a knack for jumping off bandwagons.

It seems the time is right for industry observers to swipe their claws at Wang. They are doing it with IBM. They did it a few years ago with Digital Equipment Corp. It happens still more frequently with smaller companies. That is why it seems strange that in the midst of all Wang's troubles, the typical observation was, "Well, they have some problems, but. . . ."

The "but" was usually followed by a comment about Wang being on the way back, about Wang having the right idea or Wang making a good effort.

The closest things to good news coming out of Wang in recent months have been a re-

Continued on page 51

Telex adds to IBM 3270 line

BY JAMES CONNOLLY
CW STAFF

TULSA, Okla. — Telex Computer Products, Inc. last week filled out its IBM-compatible terminal and printer family with nine printers and terminals designed for the IBM 3270 market.

Telex claimed its products offer price advantages over similar IBM products and emphasized the ability of the Telex 3270 274 control unit to support windowing functions.

Telex announced three 3270-type display terminals. The Telex 3270 191 is a 12-in. display designed to be a lower cost alternative to the IBM 3191. It reportedly displays up to 1,920 characters and costs $1,235.

Telex claimed to be the only 3270-compatible voice/data terminal vendor and added color capabilities to that type of terminal with the introduction of the Telex C179 display terminal. The C179 reportedly features integrated telephony and multiple data communications with a 14-in., four-color display supporting up to seven windows. The C179 also was designed to support Digital Equipment Corp. VT220 emulation. It costs $2,995.

The third terminal is the Telex 046, which is a 15-in., single-station control unit designed for small cluster requirements in remote locations. Telex said the terminal is functionally compatible with the IBM 3276. It costs $2,495.

Telex enhanced its 274 controller by adding windowing support for display terminals and by adding support for the IBM 3179G Graphics Display Station. The windowing feature reportedly allows attached Telex

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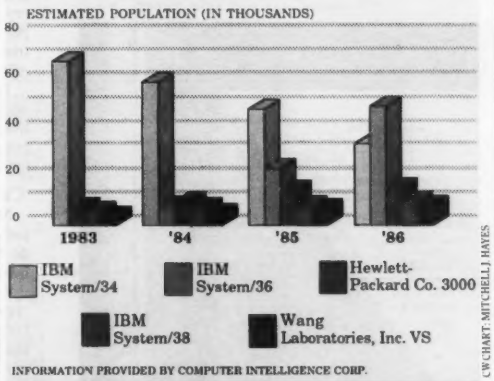
Data View

Small business systems
Population trends



INFORMATION PROVIDED BY COMPUTER INTELLIGENCE CORP.

CW CHART: MITCHELL J. HAYES

First binary tree-based system debuts

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Fifth Generation Computer Corp. has announced the first system based on the company's binary tree parallel processing architecture.

Fifth Generation's Dado is initially targeted at applications such as signal processing, expert systems, speech recognition and data base searching. The Dado architecture was developed by the company's founders during research at Columbia University. Under the architecture, up to 8,191 processing elements can

Continued on page 51

Multiuser Mark 2E premiers

BY DAVID BRIGHT
CW STAFF

TUSTIN, Calif. — Point 4 Data Corp. recently introduced an entry-level multiuser system said to operate at 3.6 million instructions per second.

"The Mark 2E is the ideal system for the growing company," President William Rigby said. "A firm can get into multiuser computing at the low four-user price and have the starter system grow with the firm up to 17 users."

Priced at $11,395, an entry-level Mark 2E includes a proprietary 280-nsec CPU; 256K bytes of random-access memory; a 27M-byte hard disk drive; a 60M-byte streaming tape back-up drive; a four-port multiplexer; and a license for the company's Iris operating system.

A 143M-byte hard disk drive and a 1M-byte floppy disk drive are optional on the Mark 2E. The system can be expanded to 16 asynchronous ports in four-port increments.

Applications software written for the machine with Iris Business Basic and Basic compilers from other companies take advantage of the operating system's powerful data management functions, the company said.

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Module extends multiuser system

BY ALAN J. RYAN
CW STAFF

SAN JOSE, Calif. — Counterpoint Computers, Inc. has released a four-processor expansion module that extends its System 19K multiprocessor computer from six to 10 processors and to 96 user I/O ports from an original 56.

Customers can reportedly add Motorola, Inc. 68020-based application processors, Motorola 68000-based 10-port terminal processors or 68020-based display processors in any combination to increase computer power, I/O ports or graphics processing capability.

The expansion also offers support for up to nine tightly coupled, bit-mapped graphics displays.

Powerful graphics cluster

Counterpoint claimed that with the expansion module a powerful six-display graphics cluster can be configured at a cost per station that is about 15% less than the cost of stand-alone workstations of equivalent power.

System 19K is a Unix-based system that begins as a six-user unit containing a 16-MHz, 68020-based main processor board, a file I/O processor and an optional Motorola 68881 floating-point coprocessor.

The package, 5 inches in height, incorporates a half-height, 100M-byte Winchester disk drive, six or 16 RS-232C terminal ports, a parallel printer port, an SCSI port and an Ethernet port.

Other expansion modules support additional mass storage to 700M bytes and interfaces to the Intel Corp. Multibus and VMEbus.

The system incorporates a System Composition Bus (SCB) that addresses all 10 processor boards and an Interprocessor Bus (IPB) that serves as the system bus addressing seven processor boards. In extended multiuser configurations, the IPB will absorb interprocessor traffic, which leaves the SCB to operate as an I/O bus.

The vendor said a 66-terminal system configured with three 68020 CPUs, six terminal processor boards, 400M-byte disk storage and cartridge tape backup would cost less than $50,000 in OEM quantities.

Multiprocessor version

To work with the System 19K, Counterpoint is offering a multiprocessor version of AT&T's Unix System V Release 3.0.

The C-XIX 3.0 operating system complies fully with the AT&T System V Interface Definition, the vendor said.

The C-XIX 3.0 will be provided as a standard feature of Counterpoint System 19K units shipped beginning in April. Upgrades will be free to existing customers through June and will cost $500 thereafter.

Controller gives remote support

WALTHAM, Mass. — Cambex Corp. has introduced a controller designed to let technical support staff control an IBM Series/1 from several miles away.

The Cambex Certainty 610-31 attachment lets users set up a duplicate Series/1 system console at a remote location. A typical use would be in conjunction with a central Help desk supporting users in other locations.

The support staff can modify system software, issue commands, carry out an initial program load and restart or input data. The product also allows technicians to provide round-the-clock support from consoles in their homes.

The controller was designed to reside in any I/O card socket in the Series/1 or the IBM Model 4965 I/O expansion unit. It costs $2,450.

Telex adds

CONTINUED FROM PAGE 49

or IBM coaxial displays to configure up to four display windows of four different host sessions. Sessions can be chosen from one or two IBM hosts as well as multiple ASCII hosts.

The company said the 274 Multiple Logical Sessions feature is a prerequisite and that data can be copied from one window to another, even if one window is an ASCII session.

The company said support for the IBM 3179G enables that graphics station to utilize all-points-addressable graphics support from a host. Multiple Logical Session support costs $1,750. The windowing feature costs $1,500. The IBM 3179G support is a no-charge option.

The printers include the Telex 201 matrix message printer, supporting draft-mode print speeds of 220 char./sec. and costing $545. The Telex 851 is an ink-jet printer with a noise level of less than 50 db that prints 220 char./sec. in draft mode. It costs $775.

The Telex 187 is an impact matrix printer designed as an alternative to the IBM 3287 and operating at 200 char./sec. in draft mode. It is priced at $3,995. The Telex 262 is designed as an alternative to the IBM 3262 Model 3 line printer and operates at 600 line/min in data processing mode. It costs $13,800.

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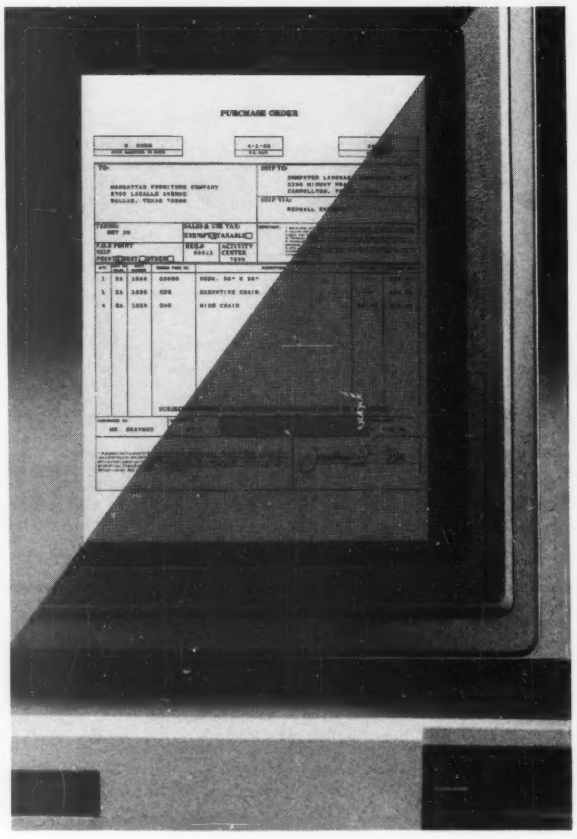

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The new form can be sent to field offices through your computer network. The expense of shipping paper forms between offices is eliminated.

Cut storage and inventory costs.

Electronic forms are stored in your system so most of your company's present cost of forms inventory and warehousing can go right to the bottom line. You can store as many as 5,000 different forms on an IBM Personal Computer AT® or PC XT®, an unlimited number on your mainframe.

One major insurance company projects annual savings of $1.8 million in warehousing costs alone.

With electronic forms, supply always equals demand.

Your company will never run out of

Wang wagon

CONTINUED FROM PAGE 49

structuring of the high end of its VS minicomputer line, promises — once again — of a new high-end system and resource sharing facility sometime in the future and company claims that order rates are picking up.

On the down side, Wang has suffered massive financial losses, layoffs, production line delays, operating system bugs (which the company says have been corrected), continued user complaints about service and support and the assorted headaches that come when a company's founder steps into the background and leaves the president's job to his son.

In addition, Wang has had to watch its Massachusetts neighbor, DEC, reap profits and positive publicity at the expense of every computer company's chief rival, IBM.

Objective criticism

Despite that down side, the criticism of Wang seems to have remained objective and restrained.

Analysts say, for example, that the management change was overdue, the software seems to have been fixed and the ultra-high-performance CPUs are less crucial to Wang users than customers in other markets.

In that respect, Wang has been lucky. Consultants and analysts have turned on companies for much more minor problems than those Wang has endured, even where those companies have had the best of intentions and made their best efforts.

Finally, the user community appears to have remained loyal to Wang. Wang users are as vociferous as any other customers, and sometimes more so, when they have complaints.

But rather than looking for an excuse to dump Wang, the users seem to be encouraging the company to make the necessary technological and management changes.

With that kind of support, Wang cannot blame the consultants or customers if the current revival efforts fail. The company is getting a fair shake.

With the Formcoder Workstation you can create electronic forms that look like your paper ones. It doesn't take a programmer; a good word processing operator can do it. The workstation is based on the IBM Personal Computer AT.

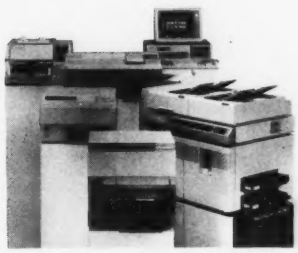
electronic forms. So employees don't waste time and delay revenue trying to replenish form supplies. Supply always *equals* demand — exactly.

One major insurance company produces 15,000 policies every night using electronic forms. They are never short a single policy page.

Obsolete forms no longer waste your company's money.

Needs change, laws change, and suddenly a lot of your paper forms aren't worth the paper they're printed on. One major bank estimates that out-of-date forms were costing them $35,000 per month.

Electronic forms eliminate this waste entirely. When a form goes out of date, you just move it to another computer file and put the new one in its place.



Laser printers print the form and the information that goes on it at the same time. No one has to align paper forms in an impact printer, then burst, assemble, and collate.

More accurate and efficient data entry.

Electronic forms can improve the quality of data.

Data entered for an electronic form can be transferred to your mainframe. In many cases, that means you can eliminate the tedious and error-prone step where someone copies information off a paper form and enters it. The person who fills out the form has *already* entered it. Data is captured at the source, and some of the people who now do "heads down" data entry can be reassigned to more productive tasks.

Finally, break the speed limit of paper.

Electronic forms are faster.

They can be filled in faster. The computer can automatically fill in standard information like a customer's address. When the same information goes on several pages, you enter it once; the computer puts it in all the right places. (A title company went from six sets of documents per person per day to thirty-six.)

Electronic forms can be printed more efficiently. Laser printers print the form and the information that goes on it at the same time. *Nobody has to align paper forms in an impact printer, then burst, assemble, and collate.*

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Wang adds tape drives to replace 2219V family

BY JAMES CONNOLLY
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc. recently announced two tri-density tape drives designed to run with its higher performance minicomputers and replace the existing Wang 2219V tape-drive family.

Wang officials said the 2248V-1 and 2248V-1S offer improved reliability and greater capacity for backup and restore.

The drives are intended for use with Wang's VS 85, VS 100, VS 300 and VS 7000 series systems. They run at 75 in./sec. and record at 800 bit/in., 1600 bit/in. and 6.25K bit/in. They use 10½- by ½-in. open-reel technology and feature automatic thread and load and automatic error detection and correction.

The 2248V-1 acts as a master unit and the 2248V-1S is an add-on unit, with each 2248V-1 able to support three add-on drives. The master unit costs $32,000 and the 2248V-1S costs $27,000.

Binary system

CONTINUED FROM PAGE 49

be strung together in tree-root fashion.

Dado uses Motorola, Inc. 68020 microprocessors as processing elements and features 128K bytes of local memory for each element. The processing elements are connected via proprietary direct memory-access circuitry.

"Dado uses a directed architecture to bring the power of parallel processing to the execution of specific classes of applications. Until Dado, the hardware platform needed to develop and run complex, advanced expert system and signal processing applications has not been available," said Leslie Hersh, vice-president and general manager of Fifth Generation.

> "DADO uses a directed architecture to bring the power of parallel processing to the execution of specific classes of applications."
>
> LESLIE HERSH
> FIFTH GENERATION COMPUTER

Dado can reportedly be used as an attached processor or accelerator to a general-purpose system or workstation.

Fifth Generation has several agreements in place in connection with development of Dado, including contracts with AT&T for developing a real-time speech recognition system and through AT&T with the Defense Advanced Research Projects Agency.

A configuration with eight processing elements costs $25,000 for digital processing and $32,000 for signal processing. A configuration with 512 processing elements costs $575,000 for digital processing and $750,000 for signal processing.

NEW PRODUCTS

Processors

Infotek Systems has introduced the **AM380**, an 8M-byte memory board for Hewlett-Packard Co.'s 9000 Series 200/300 technical workstations.

The AM380 is said to allow users to take advantage of the maximum 7.5M-byte storage capacity of the workstations with a single card that occupies only one I/O slot. It is said to provide an access time of 200 nsec. and a cycle time of 400 nsec.

With special programming software from Infotek, users can configure their systems to use the full 8M bytes of storage capacity offered by the AM380, the vendor said.

The AM380 is priced at $5,600.

Infotek Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

Data storage

Distributed Logic Corp. (DILOG) has introduced a multipurpose disk controller, called the **MQ606**, said to permit the mixing of Winchester and floppy disk drives on a single Q-bus or Digital Equipment Corp. Microvax interface.

The dual-size controller allows a maximum of two ST506 Winchester drives and two SA450 floppy disk drives to be interfaced. Both 5¼-in. and 3½-in. form factors can be handled for both types of drives.

The MQ606 is priced at $1,450.

DILOG, P.O. Box 6270, 1555 S. Sinclair St., Anaheim, Calif. 92806.

Data terminals

Tektronix, Inc. has announced a **16-in. display monitor** as an option to its 4120 series of intelligent color graphics workstations.

The monitor is said to offer 1,280- by 1,024-pixel resolution and a 60Hz noninterlaced refresh rate. It comes with a tilt and swivel base that provides 20 degrees of tilt and 360 degrees of swivel.

The 16-in. monitor interfaces to the 4120 series via standard 4120 series cables and connectors.

As a field kit for current 4120 series owners, the monitor costs $3,950. It can be used to create a dual monitor configuration.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Printers and plotters

Versatec, Inc., a Xerox company, has introduced a **44-in.-wide electrostatic plotter.**

The plotter is said to produce images at either 200 or 400 point/in. resolution on opaque paper or polyester film. It can produce color hard-copy output as well as create monochrome plots at speeds of up to 1 in./sec.

The list price for the 200 point/in. electrostatic color plotter is $72,500. The 400 point/in. model costs $82,500.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

CAD/CAM/CAE

Telesis Systems Corp. has announced a 32-bit accelerator for use with its EDA-300 and 700 Design Workstations, called the **EDA-610 Workstation Processor.**

The EDA-610 is said to deliver 1.7 million instructions per second of processing power. It consists of a Sun Microsystems, Inc. 3/52 computer, a black-and-white graphics terminal, 4M bytes of system memory, a 70M-byte Winchester disk, a ½-in. tape cartridge and one Ethernet-based communications drop. It supports Unix-based applications such as the vendor's Insight router.

The accelerator costs $15,000 for the hardware configuration; the software license fee for the Insight router is $10,000.

Telesis, Two Omni Way, Chelmsford, Mass. 01824.

Graphics systems

Force Computers, Inc. has introduced the **AGC-1**, a very high resolution VME-bus graphics engine.

The AGC-1 is said to be capable of computing 1,600 by 1,280 pixels with 16 colors or 1,160 by 870 pixels with 256 colors. It comes with 2M bytes of dual-port video random-access memory and can be integrated with very high resolution CRT displays capable of a wide bandwidth between 32 and 64 MHz.

Capabilities implemented by the AGC-1 include hardware zoom, smooth scrolling, clipping, direct palette access, windowing and red-green-blue outputs.

The AGC-1 is priced at $5,995.

Force Computers, 727 University Ave., Los Gatos, Calif. 95030.

Jupiter Systems, Inc. has introduced its **Satellite** line of color graphics display subsystems for use with Sun Microsystems, Inc. workstations.

The line offers graphics and imaging capabilities. It has a resolution of 1,280 by 1,024 pixels and frame-buffer configurations with up to 28 bit-planes of image memory per pixel.

Satellite costs from $15,000 to $30,000.

Jupiter Systems, 1100 Marina Village Pkwy., Alameda, Calif. 94501.

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What's more, DIAL-INQ is accessible seven days a week, 24 hours a day! Plus — you can inquire about products and services up to three months after each *Computerworld* SPOTLIGHT issue is published.

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If the label does not bear your name, call 1-413-637-0605 (9:00 A.M. to 9:00 P.M. EST, Monday through Friday) and ask for *Computerworld's* DIAL-INQ service. An operator will then assign you a 9-digit DIAL-INQ subscriber number which will become active immediately.

Use Computerworld's DIAL-INQ to request information as quick as a wink. Here's how:

Please note: You will be asked to use the "star" (*) and the "pound" (#) symbols on your touch-tone telephone set during your telephone call.

1. Write your DIAL-INQ subscriber number in the boxes in step 4.

2. Identify those products/services for which you're requesting more information. Write their respective DIAL-INQ reader service numbers in the boxes provided in step 6.

3. Call the *Computerworld* DIAL-INQ inquiry service via touch-tone telephone and wait for the recorded instructions.

Dial 1-413-637-3170 anytime, 7 days a week, 24 hours a day.

4. When prompted by the instructional recording, enter your DIAL-INQ subscriber number and symbols as recorded below.

☐☐☐☐☐☐☐☐☐☐ # #

5. When the recording says, "Enter magazine code and issue code," enter these numbers and symbols:

1 4 5 # 7 0 5 # #

6. You will be prompted to enter the DIAL-INQ number, including the symbols, for the first product/service you've identified below. You will be prompted to repeat this step as needed to input additional DIAL-INQ numbers.

To key in more than 17 inquiries, simply make another telephone call once you've signed off from the first.

1. ☐☐☐ # #
2. ☐☐☐ # #
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7. Complete your phone call by entering the following symbols:

# #

You've now successfully completed your inquiry call to *Computerworld* DIAL-INQ. Remember . . . you can make as many phone calls as you wish — and request information about products/services in any SPOTLIGHT section up to three months from the issue date.

INSIDE

Product Face-offs

IBM's Netview and Cincom's Net/Master network management packages square off while response-time monitors from Chicago-Soft and Uccel are chosen to challenge IBM's NPM. Pages S4 and S13.

Q & A

Mario Morino of Morino Associates discusses market trends, IBM's networking strategy and the need for an integrated approach to information management. Page S5.

Service Delivery

An automated problem management package helps Federal Express keep tabs on its 28,000-terminal network. Page S7.

Vendor Viewpoint

Multiple session products permitting easy access to CICS, IMS and TSO have caught on among IBM mainframe users. Page S15.

At a Glance

Two easy-reference charts of performance monitoring and capacity planning packages for IBM SNA networks. Pages S23 and S24.

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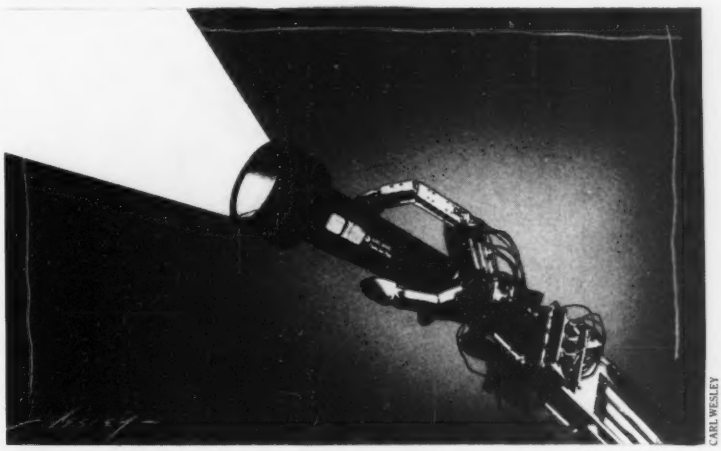
Telecommunications technology is burgeoning, but without strategic controls, networks can wind up awash in confusion.

CONTROLS FOR WIDER REACH

BY THOMAS W. MCDONALD



CARL WESLEY

In 1690, Isaac Newton was questioned about the preponderance of new theories in physics and related sciences that were being put forward by himself and his contemporaries. "The world of science advances slowly, pedantically, certainly, always in a direction toward greater knowledge. This movement forward is powered by periods of brilliance when new ideas burst forth to uncover new possibilities, new beginnings."

Telecommunications technology is currently in the midst of one of those Newtonian periods of brilliance. New beginnings and new possibilities for the users of information systems are in abundance.

Technology in the telecommunications arena has been advancing at a prodigious rate, especially in the area of end-user interconnection with centralized and distributed informational data bases.

Users who had been isolated from information systems or tied to specific sources of information have recently found themselves able to freely access multiple data bases, not only inside their corporate network but outside it as well.

Integrating these options into the working system, in conjunction with evaluating new options for the sharing of transport facilities between previously segregated varieties of information — for example, voice, data and video — presents a formidable task for the network manager.

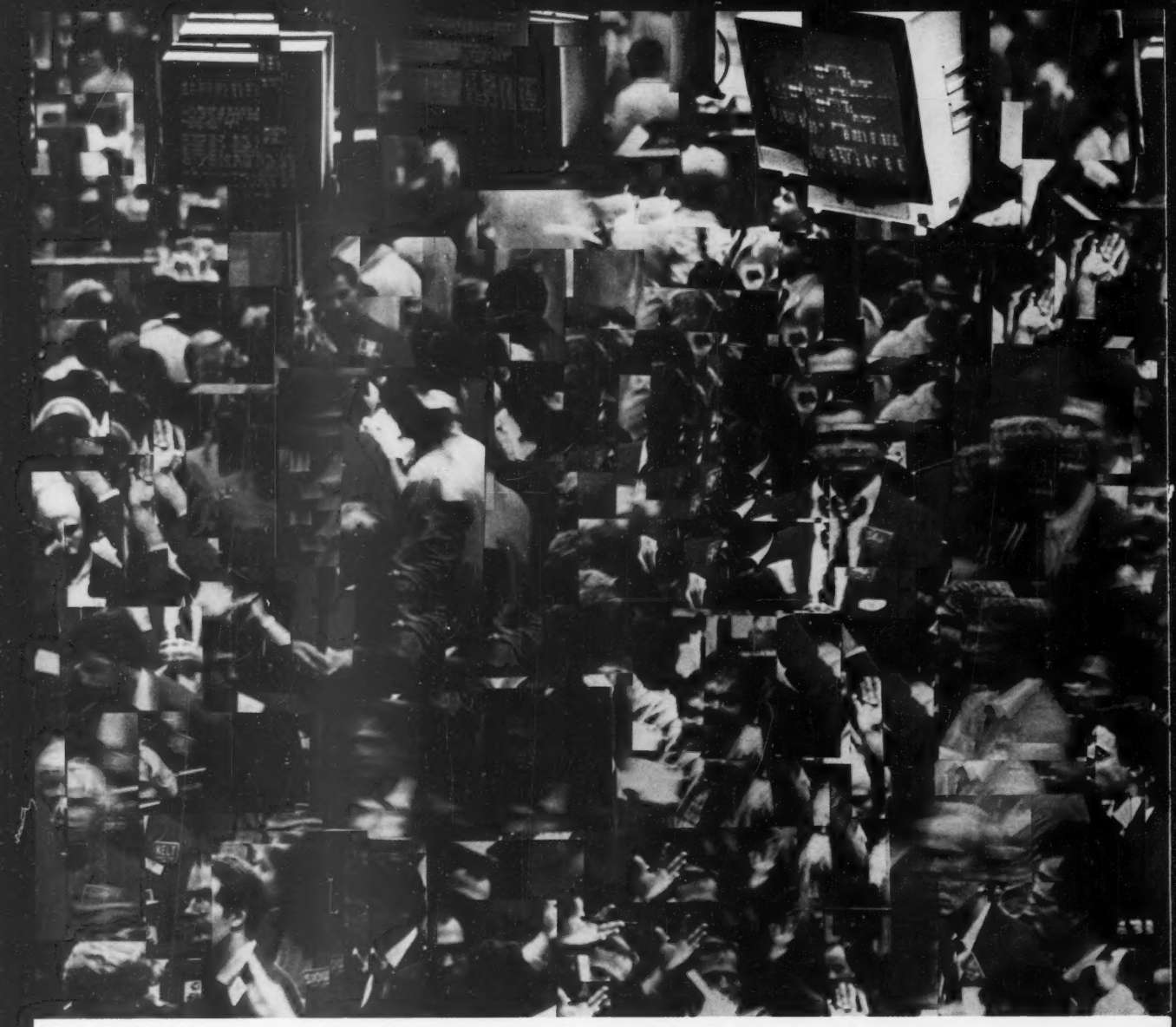
Network managers have realized that without sound strategies of network management, new technologies will bring no benefits to the network user. They have learned that without such strategies, the network does not deliver service in a reliable and consistent manner and that to implement new technologies on top of existing management structure will compound the many problems that are already apparent in managing networks today.

Today's network plays an essential role in the strategic plans of all types of businesses. Travers Waltrip, vice-president of telecommunications for The Travelers Corp. in Hartford, Conn., says, "What we manufacture is knowledge. We are a knowledge company. The capability and flexibility of our data network plays a key role in our corporate strategy. Without it, our product doesn't get delivered. It's that simple."

Bill Won, vice-president at Chemical Bank in New York, says, "We all know that the availability of information is key to the enterprise being able to do its business. The network is the conduit between information and the end customer. In the financial services industry, where we must tie into external networks and are often faced with government regulations concerning timely delivery of information, the ability of the network to provide consistent, reliable service is an absolute must."

Network management is equally critical in the communications industry. "If a network fails or

McDonald is a founding partner and principal consultant of MGT Technology Group. The firm is headquartered in Waltham, Mass., and provides software, consulting and education for network and host performance management and planning.



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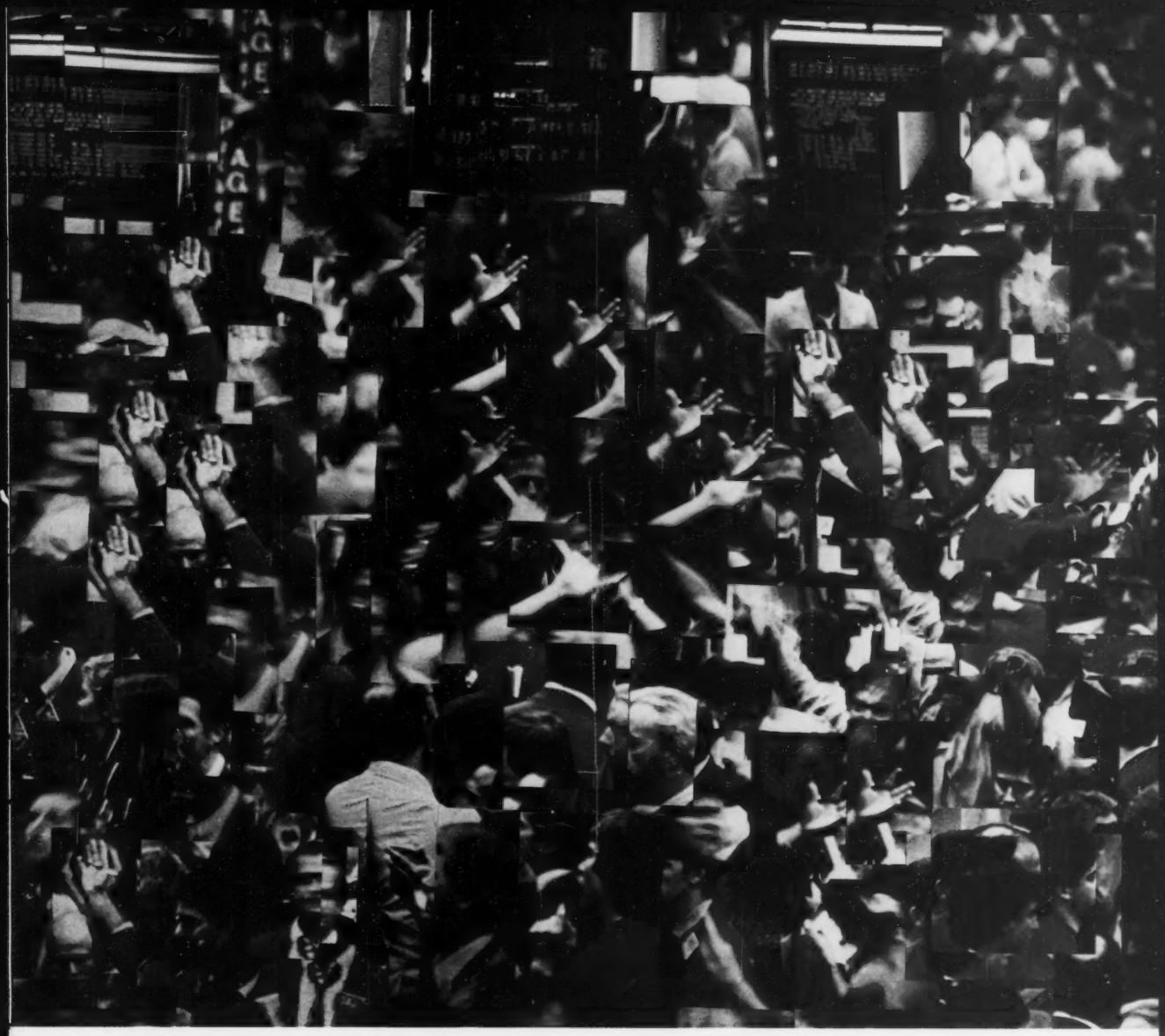

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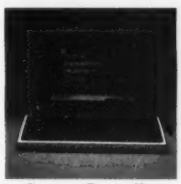

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Controls

FROM PAGE S1

communications industry. "If a network fails or behaves in a degraded mode," says Jerry Vidlak, network specialist at Centel Corp. in Lincoln, Neb., "it has a serious impact on the performance of our company.

"A network operating at less than acceptable levels means customers' orders go unfilled, inventory backs up and personnel sit around idle," Vidlak continues.

In the oil industry as well, smooth-running network operations are a must.

As Blake Wood, network design specialist at Chevron Information Technology Co. in San Ramon, Calif., explains, "Successful network operations can be directly related to successful corporate operation.

"The network has got a whole lot of attention here over the last few years, basically due to the Gulf merger," Wood continues, "but also because we moved one of our major data centers.

"I don't have to say how high

> "A network operating at less than acceptable levels means orders go unfilled, inventory backs up and personnel sit idle."
>
> JERRY VIDLAK
> CENTEL CORP.

up the repercussions can be felt when the network is a visibly failing component during these types of activities," he says.

One does not have to understand the intricacies of telecommunications or even data processing to relate to many of the problems that result when a network does not deliver expected service.

Users certainly notice when there is a problem and react to it, even though they do not know or particularly care about the exact cause.

To get an idea of the havoc that interruptions in network performance can cause, just think of some of these all-too-familiar scenes:

- Backed-up lines in front of an automated teller machine.
- Waiting on hold for a long period of time when you are attempting to make airline reservations.
- A satellite launch postponed at the last minute.
- Long lines at department store check-out areas during a busy shopping season.

Some of the problems that networks experience are less public but equally devastating to an enterprise.

- An insurance agent chooses to write a policy with an alternate agency because the dial-up connection to his initial selection fails.
- A roomful of entry clerks sits idle.
- A money transfer to the Federal Reserve System does not make a deadline, resulting in millions of dollars in interest payments being lost to a financial institution.

These are extreme instances; but everyday events have no less of an impact on corporate performance than the more dramatic instances.

Centel's Vidlak, for instance, notes that his company's network handles warehouse scheduling and inventory checking for customer orders in addition to handling work force scheduling and delivery personnel assignment.

If a network like this one were to repeatedly have trouble while performing ordinary, everyday tasks, it would have just as critical an impact on the corporate profits and on the network manager's career as one that causes a space shuttle launch to be scratched.

Well-managed network

What is it, then, that distinguishes a well-managed network, and what is it that users expect from a network?

Well, there are a number of criteria by which a network can be judged:

Reliability. The end user has come to look upon the network as a utility. It is as indispensible to the operation of his business as electricity and the U.S. mail.

User companies cannot be expected to put up with anything more than occasional outages to stay in business.

Adequate levels of service. Adequate performance of the business is tied to adequate performance of the network.

When the network service slows down or becomes inconsistent, so does the business's ability to deliver to its customers.

When the end user's service-level expectations are not met, then tasks are not completed on time, local business goals are not met, budgets are overrun and overall corporate business plans fail. Degraded network service translates directly into lost productivity.

Timely resolution of system performance problems. The end user will forgive the network if the problem is fixed quickly and does not reoccur within a reasonable period of time.

Accommodation of new requirements. When the end user determines that a new feature, available through networking, will contribute to his competitive edge, he expects prompt implementation of this feature.

Continued on page S6

PRODUCT FACE-OFF
Netview vs. Net/Master

BY THOMAS W. MCDONALD

IBM's Netview and Cincom Systems, Inc.'s Net/Master have the same purpose — to provide a single presentation structure at a host-based terminal, which then allows a network manager to manage the operation of the physical network from the same place that he manages the operation of the logical network.

Hence, component failures are flagged and diagnosed from the same location as are failures in end-to-end logical sessions.

From this single presentation structure, a network manager can be alerted to a network's failure to meet service criteria and can investigate the cause of that failure and remedy the problem by treating its source or by activating backup resources.

Focal-point applications

Both Netview and Net/Master are focal-point applications in IBM's Open Communication Architecture strategy and receive their data from the same sources — Systems Network Architecture (SNA) network components sending information through VTAM.

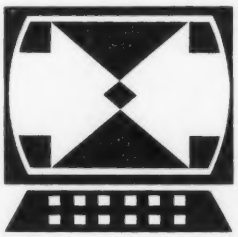
IBM's Netview/PC, announced in September and scheduled for delivery in the first quarter of this year, will allow these products to monitor data from non-SNA sources.

Like Netview, Net/Master is a standard VTAM application and requires no VTAM facilities that are not commonly available. It does not require any of the Netview facilities to run. In other words, Cincom has written its own versions of Network Problem Determination Application, Network Logical Data Manager and so forth.

Net/Master has the advantage over Netview in two areas, both of which are rooted in the sophisticated fourth-generation language that Net/Master provides for coding user procedures — Network Control Language (NCL).

Net/Master allows the programmer to write sophisticated procedures in NCL, which handle routine operational tasks, implement automatic recovery procedures in response to component failures and provide automatic problem diagnosis and resolution.

IBM's Command List (CList) facility also allows precoding of relatively simple command sequences that can automate many standard network operational tasks; however, as the procedures become more involved, use of CList can prove to be cumbersome and time-consuming.



For example, when creating programs to respond to network alerts and alarms with appropriate diagnostic and remedial action, the advantages of NCL become clear.

In fact, users tend to attribute qualities to NCL that one would expect to hear in reference to an expert system. "NCL allows us to pull off activities that we couldn't do at all, or only under great difficulty, if we were left to using CLists," says Jerry Haas, host support specialist at Northwestern Mutual Life Insurance Co. in Milwaukee, Wis.

"We had a network control program (NCP) that was repeatedly entering NCP SLODOWN. We traced the problem to our interface with a public packet data network. Essentially, someone was hanging up and a DISCONNECT wasn't occurring. Volumes of garbage were getting sent up the line, and the NCP was flooding.

"This was serious," Haas continues. "The network essentially was shutting down when we entered this SLODOWN situation."

Haas's group was able to set up an NCL procedure in Net/Master that recognized the problem session and issued a DISCONNECT before the user actually hung up.

The problem has not yet been corrected at the source, but from the network users' perspective, the problem is fixed.

"We've treated other problems the same way, using NCL procedures to treat the symptoms," Haas says. "It gives us time to catch our breath and fix the problem at the source in a methodical fashion. It is a robust language that our systems people get more excited about every day."

As networks get larger and as network expertise becomes more diluted, the ability to automate the responses of trained personnel to crisis situations will become more important.

Cross-domain

Net/Master's second advantage, though less striking than the first, lies in the area of cross-domain communications.

Both IBM and Cincom recognize that as the size of a network grows, it becomes increasingly difficult for a single operator to monitor and manage the network.

Because the volume of operational alert messages coming into VTAM is so large, the messages often roll off the screen and into the log before they are seen.

Therefore, it makes sense to segment the network logically into various levels of operation, whether based on application, geography or business classification.

At the same time, however, it is necessary to maintain the ability to implement operator commands from a central facility.

Net/Master, through NCL, maintains an advantage in its cross-domain communications by allowing commands to remote domains to be issued and carried out without the Net/Master operator establishing a logical session with those domains.

This can play an important role in recovery operations when backup procedures may cause operational impacts across multiple domains.

A user of the IBM tools who works at a large lumber and paper products company in the Northwest counters, "I approximate this facility by using an IBM 3290 multisession CRT.

"I have four sessions going on simultaneously and can roll from one to the other at a keystroke. It doesn't give me the complete assistance the process in Net/Master does, but it's close," the user says.

"The important item for me is whether or not I can gather critical operational data from any domain at my one central location. And I can do that with Netview," he continues.

IBM provides more than 150 CLists with Netview, but any user who wishes to implement automated tasks in a sophisticated manner must perform a lot of customization.

In the view of Chip Jarnagin, manager of network software at Southland Corp. in Dallas, IBM has some catching up to do in this area.

"Sure, this is IBM playing catch-up. But as we've seen over and over, if you're able to practice a little bit of patience, you will be delivered a whole lot — an up-to-date solution, fully supported and which integrates fully into your overall network and host system strategies."

INTERVIEW
TOWARD TOTAL IS MANAGEMENT

BY THOMAS W. MCDONALD

Morino Associates, Inc. has been providing products and services for the management of information systems (IS) since 1973. The company's flagship product is the Morino Information Control System (MICS). The integrated MICS data base and MICS applications, which were expanded in 1986 to include support for IBM network data, provide the basis of a complete IS management system.

Morino Associates offers two other products that contribute to an IBM Systems Network Architecture (SNA) management strategy. TSO/MON assists management and technical personnel in understanding and controlling IBM's TSO. The Problem Alert System — also known as the Software Management System — locates known, unresolved, high-impact systems software problems as well as their related fixes.

Mario Morino, cofounder, chief executive officer and president of Morino Associates, has been at the forefront of information systems management for more than 20 years. He was interviewed recently at the company's headquarters in Vienna, Va.

Many people perceive Morino Associates as providers of industry-standard products in information control systems for the IBM mainframe and I/O arenas.

At one point in time, the perception was accurate that our firm provided information control systems for the mainframe and the I/O arenas, which were mainly focused on the capacity planning and performance management areas. However, we have always provided products directed at the broader problem of overall IS management while offering specialized solutions for particular technical disciplines.

Our purpose is to provide products and services that can be used to establish a total IS management system.

Who do you see to be the users of the information you provide in networks? Are you selling to the same people that you are selling to in the host arena?

In some organizations, users are the same individuals with whom we have dealt in addressing mainframe issues. In other enterprises, our users are the network side of the house, since they are the ones who have the responsibility for network analysis, control and improvement.

Recognizing that there are separations in network responsibilities, we introduced a system called MICS/Net, which provides an entry-level foundation on which the network side can build a full IS management system.

Is it necessary to change the perception that the network area is a separate service; and, if so, how do we do that?

No, because it will probably change as a normal course of evolution. The pressure to meet user demands, the need for quality, responsive service and new integrated host and network technologies will cause the perceptions to change. Host and network groups will have to work ever more closely together and therefore resolve their attendant organizational and political differences.

In too many organizations, mini autonomous services have been established for network, VM services, office automation and so on. As is often the case, these separate units are more concerned about their individual success than the mission IS must address for the enterprise — which is providing usable, responsive, cost-effective information systems.

Why has the network arena lagged so far behind the host and I/O arenas in producing sound, workable strategies in network management?

As usual, a combination of factors is involved. First, there has been more time on the host side to evolve host-based strategies, because mainframe processing was dominant well before networks, as we now know them, were even introduced. Thus, host-based analysis capabilities had time to develop before networking was even viable for most organizations.

ALAN WITSCHONKE

Mario Morino

Second, there has been such an extraordinary growth in networks in most organizations, and such a lack of trained personnel to implement and maintain them, that there just hasn't been time to implement network management strategies.

Third, there has been a general lack of good, usable tools and information sources.

Fourth, it wasn't until network usage started to grow and become integral to the services offered by many enterprises — ATMs for banks and point-of-sale terminals for retail establishments — that top management began to focus on end-user service problems. Once that happened, tools and techniques began to emerge.

IBM's strategy seems to be to pull all its operations and performance tools together under one presentation structure, that is, Netview and Netview/PC. Is this the solution you think users are looking for?

Users are looking for an integrated strategy. There is much enthusiasm for IBM's integrated approach through Netview, but the delivery of Netview is only the beginning of what appears to be a strategic action by IBM to comprehensively address network management.

The complaints we hear about Netview remind me of what we heard in the late '60s and early '70s when IBM introduced the Systems Management Facility [SMF]. Few people remember that most of the industry thought SMF would never be accepted. Today, it is the lifeblood of information in every MVS organization in the world.

The big difference is that, by comparison, Netview is much more sophisticated as a delivery vehicle and, more important, is much more important to IBM's ability to market its products

What remains, however, is for network information to be combined in a meaningful way with all the other information that is needed to manage and control information systems.

Is there a general void in network management expertise? Will expert systems and artificial intelligence help us here, and how soon will this happen?

Networks are growing at a furious rate, and most organizations cannot keep up. There aren't enough adequately trained network specialists. And the situation will get worse, not better.

I personally believe that the application of AI and expert systems to the problems of IS management has been significantly overstated. The application of expert systems is proving most effective in other sectors for handling diagnostic problems, where rules and procedures have been well defined, and in clerical and semiclerical tasks, where procedures lend themselves to an expert systems solution.

In this context, network diagnostic systems for analyzing network hardware are clearly achievable in the foreseeable future and, in fact, are already being developed in certain circles. On the other hand, those who aspire to providing an expert systems solution for resolving general response-time problems are highly optimistic at best.

The scope and diversity of required knowledge, the number of elements in the solution process and, most important, the lack of defined rules and guidelines make an expert systems solution for this type of problem impractical, to say nothing of the staggering expense of such an undertaking.

Controls

FROM PAGE S4

A sound strategy of network management is essential to meeting network users' expectations. And like every other variety of strategy, this one too should be thought out in terms of objective and the means of reaching that objective.

The objective of a sound strategy of network management is to ensure that information flows among centralized and distributed information systems and the users of those systems in a manner that is timely, reliable, cost-effective and consistent with corporate goals.

The means for reaching this objective is to execute proper strategies of network operation management, performance management, problem diagnosis and resolution and capacity planning.

THE objective of a sound strategy of network management is to ensure that information flows among centralized and distributed information systems and the users of those systems in a manner that is timely, reliable, cost-effective and consistent with corporate goals.

Each of these four substrategies has in turn its own goals and methods, which can be pursued only after acquiring information on network behavior. Both software and hardware tools are used to carry out this acquisition.

The goals of network operation management would be the following:

- The initiation, termination or alteration, in a methodical manner, of the operation of the individual components of the network and of the network as a logical whole.
- The maintenance of a facility that will alert the network manager to exceptional situations, such as degraded activity of network hardware and software components or the loss of logical sessions between end users.
- The maintenance of a base of information for interpretation of the network's level of end-to-end reliability.

In the area of performance management, the goals that must be kept in mind are the following:

- An awareness of the consistency and effectiveness of the network services provided to the end user.
- Constant awareness of message response times and throughput rates, the resource utilization of individual network components and logical end-to-end paths.

When it comes to problem diagnosis and resolution, the goals become even more clear-cut. At this level, a network manager pursues the acquisition of detailed information to isolate and determine problems reported by operation and performance management activities and the capability of remedying those problems in a timely fashion.

Capacity planning has only one goal, but one that is critical for any forward-looking company. It is the production of a system model capable of depicting future or alternative network designs or activities so that possibilities do not have to be tried out in a live environment.

The methods for attaining these goals are in software and hardware tools that vendors have provided. They are abundant both in number and in range, from the crude to the highly sophisticated.

Before discussing how these tools can be employed to achieve the goals of reliability, adequate levels of service, timely resolution of system performance problems and accommodation of new requirements, it might be useful to examine how information flows over a network.

Any network, no matter how simple, is a nonhomogeneous system made up of separate but interdependent parts, so it is possible to trace the path that a message takes in its route between an application program and a network end user. A message may start in an application program — for example, payroll or inventory — usually resident in a mainframe processor.

The application interfaces to the network through a teleprocessing monitor program such as IBM's CICS and IMS or Cullinet Software, Inc.'s IDMS and through the host-resident network access method — IBM's VTAM or TCAM. In making this transition, the message must cross an I/O channel to arrive at a telecommunications control unit (TCU).

The TCU, which may also be called a front-end processor or a communications control unit, is not a simple hardware I/O device. It is a processor with multimegabytes of system memory and an operating system that controls the network.

After passing through the TCU, the message arrives at a modem unit. The modem provides the interface between the digital world of the TCU and host mainframe and the analog world of most existing transmission facilities. For digital transmission media, a digital service unit (DSU) is used in place of a modem.

From the modem, the message is passed on to the transmission medium, which could be a terrestrial phone link, a microwave unit, a satellite link or even fiber-optic cable. Then having crossed that medium, the message moves through a complementary modem or DSU on the

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opposite end of the transmission media and enters into a cluster control node (CCN).

The CCN is a processor of limited intelligence that controls the CRTs, printers, office automation devices and other devices in which a message may terminate. Examples of CCNs are IBM's 3174, 3274, 4700, Series/1, 8100 and System/36 and 38.

Many vendors offer plug-compatible devices for these IBM products. Minicomputers from Digital Equipment Corp., Wang Labortories, Inc., Data General Corp. and other vendors may also be configured to behave as CCNs.

Gateway processors

As more intelligent processors are used as CCNs, they become gateway processors between IBM backbone networks and non-IBM networks such as local-area networks (LAN) and networks of minicomputers.

The network exists so that the end user sitting at the terminal device on the CCN can exchange data with the application system in the host and with other end users in the network.

Between the host-attached TCU and the CCN, the message may pass through multiple intermediate TCUs. The startling fact is that it is not unusual to have each of the components listed above supplied and supported by a different vendor. In fact, a scenario in which all the components are supplied by a single vendor is, in the Systems Network Architecture (SNA) world, a rather rare occurrence.

A scenario in which all the network components are supplied by a single vendor is, in the SNA world, a rare occurrence.

Many network managers who have pieced together their networks throughout a period of years and who have looked at each component separately, not maintaining an end-to-end perspective, are now finding out that the old build-as-you-go methods do not mesh with the kind of unified management strategies required in today's data processing centers.

Chip Jarnagin, manager of network software at Southland Corp. in Dallas, has already discovered the necessity of a new approach.

"We are today at the crux of major network design and operational decisions," he says. "The old way was, 'How do I screw it together?' Then, after the fact, I would consider how I might manage it."

But as networks grew in complexity and as the information they carried became more critical, Jarnagin's group realized it could no longer manage in such a piecemeal fashion.

"Now, people are asking themselves before they screw the pieces together if each one fits into their network management strategy. I don't care how spiffy an individual component may be: If it doesn't fit into the overall management plan, I'm not going to use it," Jarnagin says.

Fits with management plan

By taking a look at the implementation of a management strategy for even a simple network, it becomes clear why Jarnagin and many of his contemporaries have come to this conclusion.

Looking at what is involved in implementing a basic facility that maintains operation alerts for exceptional network events, like failed or faulty components, it is possible to see that even a simple system can become a complicated affair.

As explained above, a message passes through many individual components during its movement between end users.

To be prepared to report on a failure in the delivery of this message, it is necessary to maintain information from each of the individual components, since a failure in any one of them jeopardizes the delivery of the message.

In a simple setting, this could easily mean interpreting and integrating operation alert messages from up to eight different vendors.

Of course, when LANs, departmental systems and non-IBM protocol networks are integrated with SNA, the problems are further complicated.

Either the network control center has to be equipped with an alert terminal for every vendor and the network operator — responding to a user who has lost communication with an application — must wheel from one screen to another as he tries to find and solve the problem, or the information from all the vendors must be brought to a central point and translated into a common format.

While the first solution is too cumbersome to be considered a long-term one, the second is too difficult for companies to implement independently.

The unpalatable choice between make-do and do-it-yourself is actually no longer necessary.

Multivendor integration

Responding to this need for multivendor integration in a network context, vendors have created a new class of highly sophisticated tools to handle this kind of network operations management.

Continued on page S10

USER PROFILE

System organizes net service

BY MICHAEL SULLIVAN-TRAINOR

Network trouble? *Fred Rice stands in front of Federal Express's problem management system*

Envision a network consisting of 28,000 on-line terminals operating 24 hours a day. Now imagine that you are responsible for ensuring there are no problems anywhere on the network.

If you think this task sounds impossible, then you would not want to trade places with Ray Peek, senior manager of network control for Federal Express Corp. Peek's 45-member network control staff keeps the 28,000 terminals up and running in the company's nearly 1,400 locations worldwide.

In addition to the problems Peek faces in managing the current situation, the network is growing at a rate of more than 5% each month because of the rapid growth of Federal Express.To keep up with this ever-expanding network, Federal Express decided to implement an automated problem management system.

In August 1985, the company acquired PNMS/Problem Management by Peregrine Systems, Inc. in Irvine, Calif. The system, based on the proprietary fourth-generation language Peregrine Four, incorporates a relational data base and report generator.

Tracks problem reporting

The goal for the system was to automate the tracking and reporting of problems in the network. But shortly after the system was implemented, Peek says, Federal Express discovered that the system might require too much processor storage capacity to make it feasible to install as a problem tracking system for the entire network.

As a result, the system has been installed to allow tracking of only those problems that require contacts with vendors or reports to the company's internal systems support. Federal Express is currently working with Peregrine to resolve the resource usage concerns.

The network's VTAM environment includes four IBM 3090s and four IBM 3084s as well as IBM terminals, controllers and Paradyne Corp. modems. Federal Express uses its own customized network management system to deal with technical problems. The Peregrine system runs under TSO on one of the 3090s.

Despite its drawbacks, the problem management system has enabled the company to develop a network control program data base that includes information on the location and type of each terminal, the front ends they are linked to, AT&T data circuits and modem types.

When a user reports a problem, the network control staff uses the automated system to identify the equipment at the problem location. Information about each terminal is listed in the data base according to an identification number for each system.The staff, which is located in Memphis, handles between 1,600 and 2,000 calls each day from terminal users throughout the world whose systems are not working properly.

According to Fred Rice, who is manager of on-line systems availability, before the automated system was installed, the staff spent a large part of its time just tracking down basic information, such as the type of equipment involved and the exact location of the problem. As a result, there was no time to keep records on many of the calls and no way to anticipate where a problem might arise.

"With the manual system, we tried to determine trends in the problems that were being reported, but the volume of data absolutely killed us," Rice says.

Alleviates user concerns

The system currently allows user departments to check on action being taken on problems they have reported. This not only alleviates user concerns but also reduces the volume of phone calls the network control staff receives.

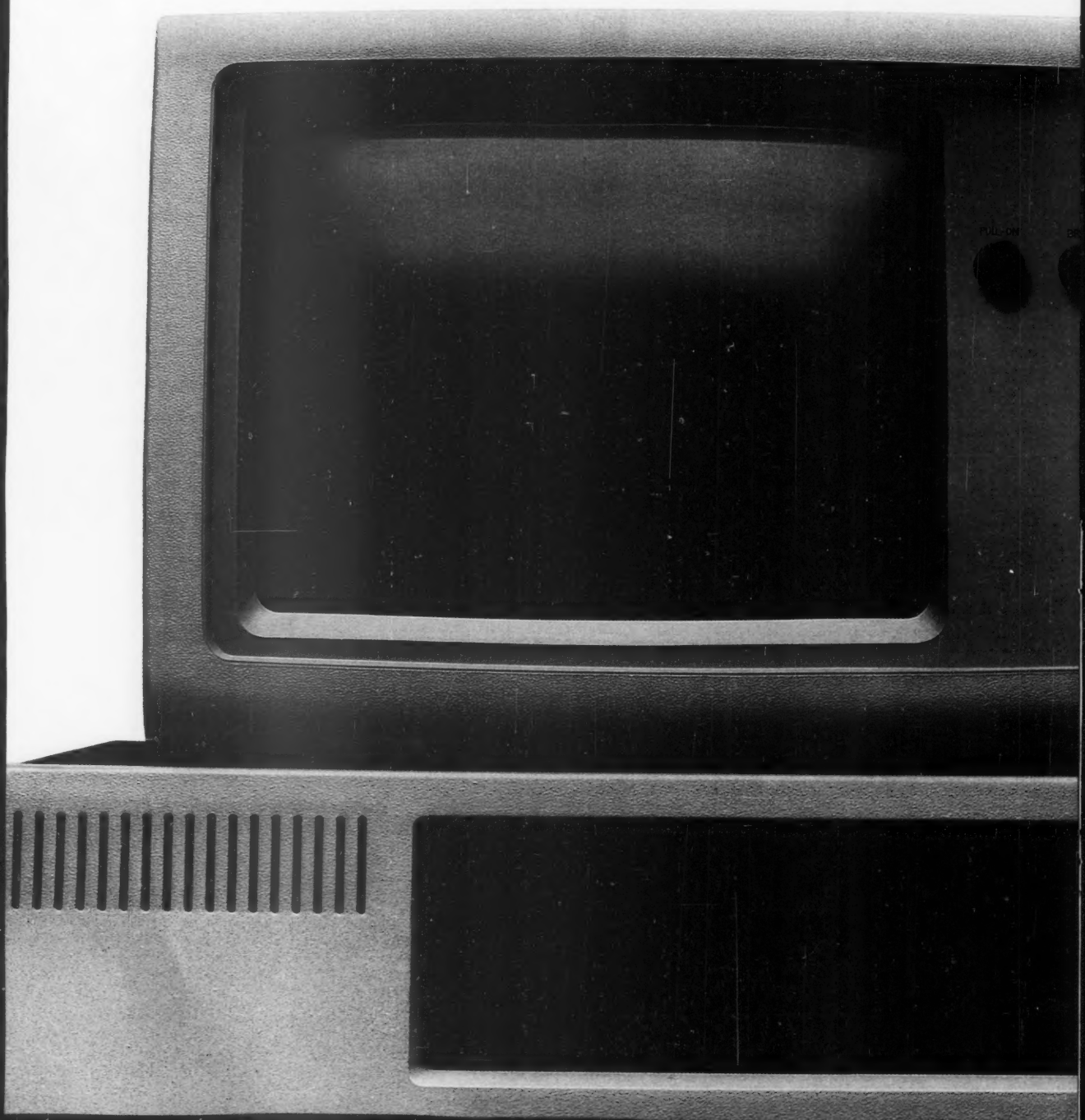
Before the problem management system was automated, Rice says, the staff could easily become overwhelmed with calls from users and not have time to respond to the problems that had already been reported."Because we were unable to identify chronic network problems," he says, "we had to wait until somebody out in the field got so mad about it that they called a management person in network control and raised hell with them."

According to Rice, 85% of the problems can be resolved simply by locating the terminal and its associated equipment, killing it and then restarting it from the main office.

If a terminal cannot be restarted, then test equipment is used to examine the circuits and other devices involved.Often, the problem is traced to an AT&T circuit. Circuit problems are addressed by placing a repair call to the vendor.

Sullivan-Trainor is a *Computerworld* senior writer.

Underachiever.



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DIAL-INQ READER SERVICE NUMBER 9

Controls

FROM PAGE S7

When it comes to network performance monitoring, however, development has been slower. Next to the criticality of maintaining network operations, the concept of monitoring performance levels seemed less than a top priority to developers.

The importance of maintaining network operations is obvious. If an operation strategy were not in place, a network could not function. The messages would not get delivered. If a major component were down, then to a certain number of users, the network would be rendered completely inoperative.

IN Zen Buddhism, there is a saying, "When the student is ready, the teacher will appear." In this instance, we can say that when the network marketplace was ready, the vendors appeared.

When it comes to performance monitoring, the situation is not as severe. If a performance monitoring strategy were not in place, the network manager may not know what level of service he was providing to the end user, but he would still know whether the message got delivered.

A network, though delivering a response time that was grossly unacceptable or one that was acceptable but on the brink of entering a degraded mode of operation, could still be considered to be functioning.

The second reason that the performance issues seem less critical than the operation issues is that the nature of performance measurements make the independence of the components less of a problem. Performance is chiefly concerned with response time, message throughput and component utilization. These can all be measured independently at single spots in the network without giving regard to measuring them at every component.

There were three things that eventually happened to alert network users to the need for more sophisticated and well-integrated performance tools.

Network users awaken

First, as networks became more complicated, it became increasingly difficult to tell when a problem was an operational one and when it was due to degraded performance.

Second, as users became more savvy, they realized that there was variance in the level of quality of service the network was delivering — the network was not just up or down. They began to request service-level guarantees.

Third, as corporations implemented accounting and network chargeback systems, they determined that service-level guarantees were necessary to determine rate structures. The strategy of performance management began to carry more significance.

Corporations recognized that there would have to be further sophistication of the performance management strategy, and, like the operation strategy, there was a need to integrate all the pieces.

Impact on capacity planning

The need for more sophisticated tools was also soon felt in the capacity planning area. With the recognition of the critical nature of network activity and its direct effects on corporate operation, another need was recognized — the need to bring new users and functions onto the network within the existing service levels.

The old way of adding new users, watching performance degrade and then fixing the network to provide adequate service, was no longer acceptable. The users and their data were too critical. Office managers were betting their budgets on their workers receiving an expected service level from the network.

When the network failed to supply the expected level of service, workers did not complete their assignments on time, local budgets were overrun and overall corporate business plans failed. Tools that allowed the network manager to plan effectively were necessary.

Clearly, for the network to fulfill its role as a crucial component of the corporate strategy, an integration of tools and the development of more sophisticated ones was necessary.

In Zen Buddhism, there is a saying, "When the student is ready, the teacher will appear." In this case, we can say that when the network marketplace was ready, the vendors appeared.

Products appeared that allowed us to integrate operation alert tools, integrate and provide a greater level of detail in performance tools and tools to plan and test-drive future network situations before we implemented them. These products provide the means for achieving the goals of the four substrategies that make up the main strategy of network management.

What has the availability of these tools meant at the bottom line?

Centel's Vidlak says, "Five years ago, before we had a network management strategy in place, we operated like all shops did then — and like many, unfortunately, still do today. That is, a response-time problem could come up, and it might never get resolved, unless by accident.

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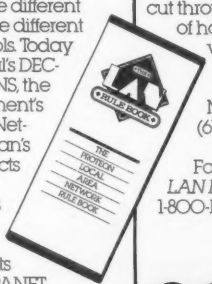

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DIAL-INQ READER SERVICE NUMBER 10

"The Help desk in those days was more of a comforting station," Vidlak continues. "A user would call with a problem, and we'd reply that we'd get back to him in an hour or so. We really had only the most basic tools — that's all that was in existence then.

"Now with the network operation, performance and planning strategy we have in place, problems are often solved before the end user ever notices them," Vidlak continues. "In the time period in which our network has grown by 36%, our trouble calls have been reduced from a rate of almost 60,000 a year to about 20,000."

Network operation encompasses a wide range of activities, including interactions with the lowest levels of the network architecture for both mechanical functions — like matrix switching — or maintenance activities like bit error-rate testing of transmission media.

There are literally hundreds of vendors that supply products in this arena. This article, however, will concentrate only on operation management tools that deal with the higher levels of system operation, that is, products that help to perform continuous surveillance to detect exceptional network events — like failed components or conversations — and to implement solutions when such exceptional events occur.

> "WITH the network operation, performance and planning strategy we have in place, problems are often solved before the end user ever notices them."
>
> JERRY VIDLAK
> CENTEL CORP.

These tools form the basis of network operation control and are installed in every shop. They are tools the network cannot live without.

The VTAM access method resides in the host and is the controlling software for network operation.

It is from VTAM that commands are issued that activate, deactivate and switch network components.

When a network component senses a hardware or software problem, it sends the alert to VTAM. VTAM passes this operation alert information through its IBM Communications Network Management and Principal Program Operator interfaces to applications and command processors that are designed to accept this information and that format the information for presentation.

These applications also accept network operator input that they forward to VTAM, which in turn issues network commands.

The type of data handed back and forth across this interface, between VTAM and the application, consists of solicited or unsolicited system information — such as notification that a network control program (NCP) has failed or that a user's conversation with an application has been interrupted — and operator-solicited data such as information on requesting a modem to initiate a self-test.

These applications are the tools that make up the operation management strategy. IBM markets a set of products with industry standards for these tools. These include Network Communication Control Facility (NCCF), Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM). These products form the backbone of almost all IBM network management strategies.

A functionally compatible product is offered by Cincom Systems, Inc.called Net/Master (see story page S4).

Functions of the tools

NPDA keeps network operators informed of the health of the physical network resources and provides alerts about transmission errors, failures in network components or a component's need for intervention — for example, a printer that has run out of paper.

NPDA is an application program operating under NCCF, the command processor for NPDA and NLDM. Information is passed to NPDA from the NCP in which user-set threshold limits for temporary transmission errors are monitored.

Whenever these limits are exceeded, information is forwarded to NPDA. Information is also forwarded on network component failures or permanent link errors.

These exception messages are presented at the network operator's screen, then rolled to a log file or formatted to a data base, where they are available for review.

Like NPDA, NLDM operates as an NCCF application. NLDM allows the network operator to maintain a watch over the logical end-to-end conversation taking place among network end users.

For instance, the network operator can determine who is in conversation with CICS or any other application or subsystem at any given time and how long the conversation has been going on.

When a problem occurs in a particular conversation, NLDM can be queried to display a blow-by-blow account of what led to the problem.

IBM refers to this type of information as "accounting and availability" because NLDM will gather information from the implementation of a VTAM path information unit trace and produce data on session connect time and traffic statistics.

Continued on page S13

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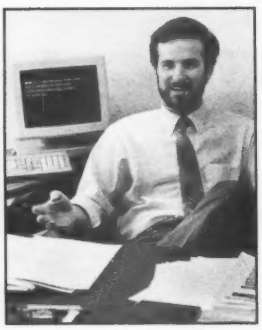

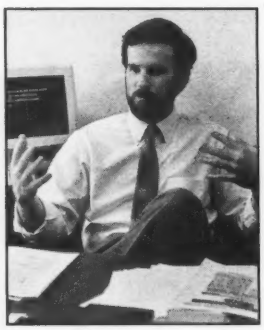

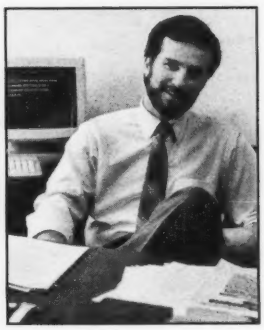

Falco Data Products likes to describe its new Falco 500 high-performance video display terminal as *"spectacular."* And, in late 1985, when Falco wanted to tell MIS/DP directors — who buy terminals in quantity for their companies — about this *"spectacular"* device and its distribution through national sales channels, the company chose Computerworld — along with some other MIS/DP publications.

But, says Director of Marketing Tom Sullivan, when sales leads started coming, the number of leads generated by Computerworld was twice the number generated by the other books. *"That's pretty spectacular in itself,"* Tom says. *"We were also using the other well-known MIS/DP publication and a host of other books. When you consider the fact that Computerworld outdrew them all by a 2-1 margin, I think the only word for it is "spectacular."*

And those leads are still coming in. *"We're continuing to receive a steady flow of responses,"* Tom confirms. *"Front or back, left or right; no matter where our ad appears, it pulls very well."*

Shortly after seeing the success of Computerworld ads, Falco dropped the other major publication from its list. *"Our leads and feedback from the field told us that Computerworld is better. Besides,"* he adds, *"how can you argue with a 2-1 margin?"*

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CONTROL

FROM S11

While a case can be made that this information could be helpful in rudimentary accounting procedures, it is not the information normally considered usable for availability diagnosis, since data is produced only for those users who have a functioning connection — that is, a terminal, control unit and front-end processor — and when transmission media are all operational.

Also, many users have stated that the CPU and common storage area overhead incurred when gathering this information exceeds acceptable limits.

NLDM also gathers limited response-time information through IBM's Response-Time Monitor (RTM) feature.

General uneasiness

While IBM's network management strategy was being implemented throughout the industry, there was a general uneasiness among users with this group of rather cumbersome, hard-to-use products. Generally, these products were perceived as difficult to install and operate.

Initial releases of NLDM left many people complaining about the host resources it required and about bugs that could cause serious problems for VTAM. To perform other than rudimentary functions, much customization was required. Chevron's Wood says, "There's no doubt that these are indispensable products. We use them every day. But unless you spend a lot of time customizing the product, they don't do what you need.

"If something major goes wrong," Wood continues, "I have to know 'right now.' With NPDA, if I lose a major node — an NCP for instance — the message on the NPDA panel looks the same as the message that tells me a 3800 printer just ran out of paper. And sometimes, those messages come in so fast, they roll off the screen and into the log before I've even seen them."

Filling the bill without IBM

Unhappiness with these IBM products led Share and Guide, IBM users groups, to formally request a more cohesive, easy-to-use and easy-to-install network management product. Some users chose to take advantage of the value-added features in the Cincom products, while others waited for IBM to deliver what it had promised.

In May 1986, IBM announced Netview, which is now generally available. The product runs as a VTAM application program under the MVS/370, VM or MVS/XA operating systems.

Netview integrates and enhances the functions of NCCF,

Continued on next page

PRODUCT FACE-OFF

Netspy vs. Mazdamon

BY THOMAS W. MCDONALD

Most managers of IBM networks who have chosen to use software to gather response-time information for interactive applications running under VTAM use IBM's Network Performance Monitor (NPM). However, four major drawbacks of this package merit consideration:

- The application must be running in definite-response mode.
- No response-time information is reported for TSO.
- Report structures are rigid and are designed and formatted to be read by systems personnel.
- A significant portion of direct access storage devices (DASD) must be dedicated to collecting the information.

Some of these drawbacks are inherent in software monitors, no matter which one is used. Some, however, can be remedied by replacing IBM's product with one of its major competitors — Netspy from Chicago-Soft Ltd. in Chicago or Mazdamon, recently acquired by Uccel Corp. Both of these vendors approaches the four problems mentioned above in different ways.

The need for definite-response mode. Because software monitors are resident in the host processor, the only way they can collect response-time information is to start a timer when a message exits the host and to stop it when the response to that message returns to the host.

> THE problem of implementing definite-response mode turns out to be more one of politics than of technology.

As a result, either the response-time monitor generates its own control message, or it monitors existing network mechanisms of control such as definite-response mode.

The problem of implementing definite-response mode turns out to be more one of politics than of technology (see main story). Netspy circumvents the politics by offering a facility called FORCEDR. The FORCEDR command allows definite-response mode to be turned on without involving application personnel.

The application remains isolated from the operation, and no application buffers are used. The network manager can operate the needed commands without involving mainframe systems personnel.

The significance of this facility is pointed out by one Netspy user:

"When I request of the IBM CICS programmer that he turn definite-response mode on for me, I am putting myself in an extremely vulnerable position. I'm going to get blamed for anything that might go wrong in the system. If a programmer gets run over by a truck on his way to lunch, it's somehow traced to the fact that definite-response mode was implemented. With FORCEDR, nobody even knows a change has been made."

Inability to report response time for TSO. Definite-response messages for TSO are not handled in the same fashion as they are for other applications. VTAM measurement probes are positioned so that they are unable to detect the definite-response messages destined for TSO.

Both Netspy and Mazdamon are able to report on TSO response time by placing the measurement probes at the appropriate positions in VTAM.

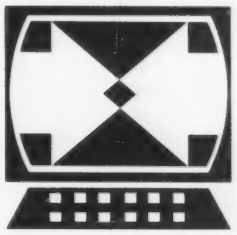
Lack of flexibility in reporting structure. All three products offer batch and on-line reporting facilities. All users of these products implement reports through batch mode. Most also use the on-line feature.

NPM provides complete information in its reports but is lacking in presentation style. IBM's Service Level Reporter can, however, be used to enhance the systems programmer orientation of NPM's reporting style with a management orientation.

Netspy offers a more flexible reporting structure and provides an interface to SAS Institute, Inc.'s Statistical Analysis data bases. Netspy users claim the process is effortless for integrating raw Netspy data into commonly used performance data base systems such as Morino Information Control System (MICS) from Morino Associates, Inc. or MXG data base from Merrill Consultants.

Mazdamon, however, is clearly the leader when it comes to reporting. This product offers a relatively sophisticated SAS-based data base with more than 100 reports available in an easy-to-use format.

After-the-fact reporting is not



always enough to maintain sound network performance. On-line notification is often needed for problem awareness, diagnosis and resolution. All three products offer on-line reporting of response-time information with a minimum of processor overhead.

Mazdamon holds the advantage in on-line reporting due to its level of detail, the variety of its on-line reports and the number of exception criteria that can be specified.

For instance, a Mazdamon user could ask to see a report that specifies all users within two different application groups who share terminal residence on a specific transmission line and who have received response times greater than six seconds during the last three-minute period. Neither NPM nor Netspy offer this level of detail.

Mazdamon offers features that allow personnel who may possess only a rudimentary knowledge of networking to produce management-level reports on network performance and planning. Full-screen prompts guide such users in the production of graphics or tabular reports.

"The IBM ISPF-based facility has allowed me to set up procedures for my manager and other systems personnel who might not be directly related to the network," one Mazdamon user says. "My manager can get the particulars on an irate user's problem immediately, right from his terminal in his office, and he doesn't have to understand JCL or SAS or Mazdamon to use it."

Both Netspy and Mazdamon offer interfaces to MICS.

None of the three products offers alerting features as robust as those offered by the hardware response-time monitor vendors that take advantage of stand-alone processors and color CRTs to present vivid and detailed alerting information.

Requires significant DASD resources. There seems to be no way around the problem of DASD requirements. All three products mentioned are equally flawed in this respect. Consequently, many organizations still need to implement response-time monitoring through a hardware solution.

Each of the products possesses some unique attributes. Mazdamon is the only one of the three able to manipulate information at the application transaction level. For sites that wish to treat individual applications that run under CICS, IMS, TSO or any other subsystem as independent entities, this is a crucial consideration.

NPM, for its part, is the only one that supports the VM environment. And when IBM pulls together all the pieces of its network strategy under a common umbrella, the NPM data will be controlled from the same central terminal as the operational tools.

In a three-way comparison, each product can claim some distinct advantages. Mazdamon stands out because of its data base technology and its on-line and management reporting flexibility. It is clearly the most robust product, but there is a price for the added power: Mazdamon costs about twice as much as either of the others.

> THERE seems to be no way around DASD requirements. Many organizations still need to implement response-time monitoring through a hardware solution.

Also, users note two major drawbacks in using it. The first concerns implementation requirements. Mazdamon comes up as the main task in the address space, and it attaches VTAM. The second drawback, a lack of support for NPM's network data collection and analysis, will be remedied in the first quarter of this year, as Mazdamon has recently been acquired, and the product's author and developer, Soli Surty, is contracted to stay with the product for at least one year.

Netspy, priced comparatively to NPM, is notable for its ability to ease the pain of implementing definite-response mode and for its flexible report structure.

NPM has the undeniable advantage of being supplied and supported by a powerful vendor, widely recognized for its technical support.

Controls

FROM PREVIOUS PAGE

NPDA and NLDM and adds the capabilities of two additional products — VTAM Node Control Application and Network Management Productivity Facility (NMPF). These provide functions such as Help screens, Command List (CList) support, Help desk facility and on-line log browsing capability.

Single presentation structure

Netview's most obvious improvement is that, through the command facility — the functional equivalent of NCCF — the network operator need only cope with a single presentation structure for all of the components of Netview. It is no longer necessary to flip among multiple products when tracking down a problem.

Any Netview command can be entered at any Netview screen. From the same screen, an operator can activate or deactivate network resources, recognize problems as they occur, isolate a failing component, invoke line and resource tests and take corrective actions.

IF Netview and Net/Master are attempting to provide a single interface to monitor the entire corporate network, then they must monitor data from non-SNA and non-IBM sources. IBM's Netview/PC accomplishes this.

With this product, data is presented in a consistent manner and color, and program function keys are consistently used by all of Netview's components.

More than 150 CLists are supplied and supported with Netview, making it much easier to set up lists of VTAM commands that will initiate regularly scheduled network operation activities. CLists may also be built to handle more involved tasks of network diagnostic and recovery functions. While these products solve many of the problems for the network manager, they do not, by themselves, handle the problem of integrating information from non-SNA and non-IBM components.

A separate facility is still maintained at the network control center to handle alerts coming from common carriers, T1 vendors, private branch exchanges (PBX), Rolm Corp. Computerized Branch Exchanges (CBX) and any source of non-IBM equipment. This problem is addressed, instead, with Netview/PC.

Netview/PC

If Netview and Net/Master are attempting to provide a single interface to monitor the entire corporate network, then they must monitor data from non-SNA and non-IBM sources. IBM's Netview/PC accomplishes this.

Announced in September, along with the Open Communications Architecture (OCA), Netview/PC is scheduled for general availability in the first quarter of 1987.

The OCA defines three architectural layers:

- Focal point — This is physically implemented as the network management host. The focal point provides for the consolidation of network management data from all resources managed by that host.

This information is brought together under centralized network management applications called focal-point applications. Netview and Net/Master are both examples of focal-point applications.

The term "focal-point application" will be used in this article as a generic term to refer to both Netview and Net/Master.

- Entry points — These are logical locations within SNA components that forward data concerning their own operations — and that of components under their control — to the focal-point applications. Commands or control protocols for the manipulation of these components and resources flow between focal point and entry point.

Examples of components that house entry points include IBM 3705 or 3725 or 3720 TCU, 3174 or 3274 CCN, System/36 or 38, distributed processors and any other physical unit in an SNA network.

- Service points — These are components in the SNA network that can serve as gateways to the focal-point applications for network management data coming from non-SNA products, such as CBX/PBXs, LANs and other vendor networks. The service point does not transfer end-user data. Netview/PC is a service point.

Netview/PC is a problem management and alert management tool. It is the bridge by which the central monitoring facility in the host, that is, the focal-point application, is able to access operational and alerting information from sources beyond the SNA environment, such as from non-SNA-addressable networks, voice networks and networks supplied by other vendors. Netview/PC is also a means to solve problems occurring in remote networks.

Open architecture

Last summer, IBM invited seven communications software vendors to Raleigh, N.C., to assist in the development of Netview/PC. It was clear from the start that this would be an open architecture, and more than 15 vendors have already announced plans to interface to Netview/PC.

Continued on page S18

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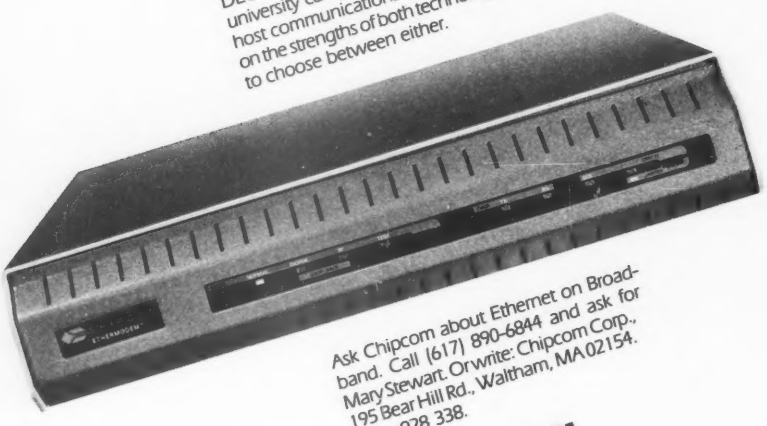

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DIAL-INQ READER SERVICE NUMBER 12

VENDOR VIEWPOINT
Managing VTAM sessions by SNA rules

BY THOMAS J. VOLLMAR

Multiple-session products for VTAM networks attracted a large following of IBM mainframe users in 1986. The technology does in fact offer some useful benefits.

Multiple-session products allow users of IBM CICS, TSO, IMS and so on to switch between those systems without having to sign off of one and on to another — a process that can consume as much as one hour a day per user.

For a company with 20 users, this translates to a productivity loss in excess of $100,000 per year.

But, in order to realize the productivity and ease-of-access benefits offered by these products, it is necessary to understand how they address issues such as these:

- The access needs of a wide variety of users.
- Network security.
- Administering system use.

Easy access for all users

The primary goal in implementing these products is to provide users with easy access to systems like CICS, IMS and TSO. Users access the network in a variety of ways.

For the sake of discussion, network users can be classified according to their work habits.

Type A users are authorized to access only one application or a single session. Type B users can access multiple applications one at a time, and Type C users are authorized to access multiple applications concurrently.

In a typical organization, the user population breakdown will approximate the following:

- Type A — Single application users: 10%.
- Type B — Multiple nonconcurrent users: 70%.
- Type C — Multiple concurrent users: 20%.

Most session managers focus on only the 20% of users requiring access to multiple concurrent sessions.

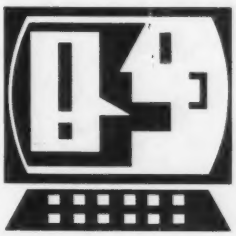
The managers provide no facilities for making the systems accessible to the other 80% who actually need this help the most.

The majority of productivity opportunities does lie with the servicing of this small group of power users, yet the value of improving productivity and service levels across the entire network is well worth considering.

Today's network staff must be foresighted enough to anticipate the growing needs of its users and, consequently, of the network. The staff must also begin thinking in terms of access management tools that will help it to service all users on the network.

Secure access for users

A product well designed and engineered to accommodate this broader responsibility of the network staff will pay big dividends in improved service levels for all users and reduced maintenance for the network staff.



Most multiple-session products that are available today provide security that is designed to prevent unauthorized access to the network.

Typically, they also provide interfaces to popular security packages such as Uccel Corp.'s ACF2, RACF Productivity Aid from IBM and Top Secret from Computer Associates International, Inc.

Yet, the implementation will vary depending on whether the product was built to handle only concurrent multiple-session users or all types of users.

The foresighted network staff will also do well to address the network security issue for all users of the network rather than for only one group.

That way, the installation can control who gets into the network, who gets into CICS, TSO and so on and how users may access these systems — whether through concurrent sessions, through a single application at a time or through a single application only.

Administration of the software

Administering the use of these systems also has broad implications. Can the Help desk broadcast to all users on the network?

Do the products play by Systems Network Architecture (SNA) rules? If access to computers is made easy and productive for all users, can the system still be reasonably managed and controlled?

Playing by SNA rules is an absolute prerequisite for any network management software.

VTAM is a strategic core of SNA, and for that reason, it is best to stick with standard VTAM interfaces and adhere to the rules defined in SNA. These rules include the following:

- One terminal may carry on only one session with an application at a time.
- An application may conduct parallel sessions with more than one terminal.
- The log-mode table for a particular terminal must match the terminal control table (CICS) or the IMS logical terminal entry for that terminal.

How your software manages single and multiple sessions while conforming to these SNA rules will affect your ability to administer the software.

How often do you have to define virtual logical units: Initially? Every time a terminal gets moved? Are user IDs duplicated in ACF2 and in the access/session manager?

Most systems allow operators some degree of network management through broadcasting capabilities.

At the very least, the operator or network staff has a vehicle to more efficiently communicate with users. But there are several different flavors that can be found in the software design.

A basic question you should ask is, Can I use the same broadcast facility to reach the following:

- Single and multiple session users?
- CICS, TSO, IMS and other users?
- Active and idle terminals?
- LU2- and LU1-type terminals?

Another helpful feature is the ability to set up broadcast messages to be sent automatically when some event occurs within the network.

In some cases, the broadcast message can be tailored to a particular situation or sent only to the appropriate user or groups of users.

There are other questions to ask: If a CICS needs maintenance, can you suspend logons to keep users off CICS? Can the operator route users to another CICS while the maintenance is being performed? Can this rerouting be set up to occur automatically — without operator intervention and without the users knowing they were signed on to CICS/A or CICS/B?

Operators, like users, will fall into Type A, B, or C in terms of their access requirements. So, it is useful to ask if the access/session management software will service all types of operators as well as users.

In other words, will you be able to manage and control the security and access requirements of LU1 terminals or X.25 devices emulating IBM 3767 devices?

Multiple concurrent sessions represents a great advance in technology. But it is just one variation on a broader theme of network access. Multiple-session products should evolve to make network access easy and productive for all users.

They should provide common security, common broadcasting and common network management capabilities to all users.

Network staffs are playing a catch-up game already. Increasingly more users require access to computers through the network. Those networks — and the number of users — are growing faster than the ability to manage them.

Vollmar is market manager for Cincom Systems, Inc.'s Net/Master network management systems product.

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DIAL-INQ READER SERVICE NUMBER 13

Control

FROM PAGE S14

What does this mean? It means that information such as alert records from a personal computer-managed LAN, call detail records from a CBX, operational statistics from a T1 handler and error rates from long-distance carriers can now be made available to a focal-point application for operational or accounting purposes.

Device-specific applications will reside in the PC housing Netview/PC. The non-SNA device or network that forwards the information will be linked to the PC.

The PC application will accept the alerts coming from the specific source and convert them to a common format, such as IBM's Communications Network Management format, acceptable to the focal-point application. These applications will, for the most part, be written by vendors that wish to integrate their information into the focal-point application.

IBM is offering applications for the Rolm CBX to interface with both the alert monitor and the call detail records collector. Soon to follow is an application for the IBM Token-Ring network.

A PC running Netview need not be attended; it could operate in a locked closet. The aim is to have the PC software recognize the alert messages and problems and solve the local problem at the local level by initiating remedial action whenever possible.

A PC running Netview need not be attended; it could operate in a locked closet. The aim is to have the PC software recognize the alert messages and problems and solve the local problem at the local level by initiating remedial action whenever possible.

The lowest level

The aim is to solve the problem at the lowest possible level. IBM provides eight standard CLists to carry out local functions such as status check, test, change physical configuration and display path.

Netview/PC forwards data to the host via two mechanisms. The first uses a standard VTAM-to-PC System Service Control Point to physical unit) SNA session. Netview/PC forwards the data to the focal-point application through the same VTAM interfaces from which it regularly receives data.

The second mechanism is via the establishment of an LU6.2 Advanced-Program-to-Program Communications (APPC) session between Netview/PC and a host application. CICS is currently the only 370 host application that supports LU6.2 communication.

It is unlikely that large volumes of data received by Netview/PC — such as CBX call detail records — will be sent to the focal-point application through the standard VTAM interface. The focal-point application is set to handle alerts and commands off this interface — messages it expects to receive one at a time.

It is more likely that the call detail records will be sent via APPC to a CICS application that will produce a report or format the data to a data base. The focal-point applications are a less likely place than CICS to write application code.

Product or strategy?

This leads to the question about focal-point applications: Is Netview a program product, or is it an idea, a strategy? While IBM maintains that Netview is a specific host-based program product, Netview/PC is sending data to a host CICS application, not to Netview.

The next logical step — that of allowing two-way communications between the focal-point application and Netview/PC and the various networks — has not been implemented.

If it were, the focal-point application could react to a problem situation and send commands via Netview/PC to initiate diagnosis or remedial action in the various networks.

For instance, if a network operator discovers a problem at a T1 handler in the field, he must step outside of the Netview-to-Netview/PC chain of command to run diagnostic tests or implement a configuration change.

As it now stands, Netview/PC, used in conjunction with a focal-point application such as Netview or Net/Master, takes a giant step in allowing for a fully integrated approach to be undertaken for the management, problem diagnosis and problem resolution involved in the operation of a network managed from a central IBM facility.

Net/Command from Avant-Garde Computing, Inc. provides a similar function to that offered by Netview/PC. Net/Command functions similarly to Netview/PC in that it requires vendors and end users to write program interfaces between their own systems and Net/Command.

As an adjunct to the operational management tools mentioned, Netpic from Travtech, Inc., one of The Travelers' companies, offers popular features. Netpic provides a pictorial control-tower

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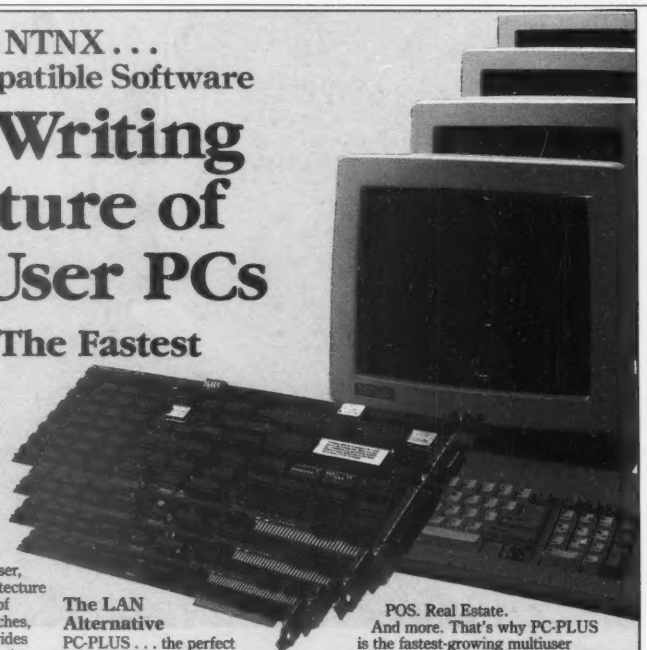

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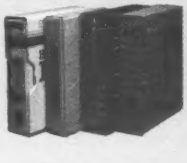

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DIAL-INQ READER SERVICE NUMBER 14

view of the network.

A color-coded display shows all of the major network components — TCUs, transmission groups, hosts, access methods and applications.

Further, if any of the major components of the backbone network fail or if a transmission group begins to operate in a degraded fashion, the display presents a vivid alert.

Chevron's Wood, a Netpic user, appreciates the extra warning. "Before Netpic, it sometimes took up to half an hour for us to realize we lost an NCP," he explains. "It's not as easy as you might think. You get calls at the Help desk that say, 'My session went away.'

"You're probably looking at things on a terminal-by-terminal basis," Wood continues, "and the problem gets exacerbated by the sheer numbers of calls, terminals and NCPs.

"The Help desk queue would finally build up to a point, and someone would notice the number of troubled users who all pass through a certain NCP. You don't have to be locally attached to an NCP for its failure to affect you," Woods says.

Netpic is not, however, a technological breakthrough. It gathers data in a fashion similar to Netview and Net/Master and issues standard VTAM commands. What it does provide is one very useful feature — a vivid visual alert — that some managers deem critical.

And since Netpic displays the network simply, in its building blocks, a manager of any facet of the information system who may not be familiar with network jargon can have access to network alert information on his desk to reply to queries of system service.

Wood admires the simplicity of Netpic. "People ask me: 'Is that all it does?' That's right. It's a pure alerting tool," he says. "Nobody's going to go to a secondary screen and leave it unattended. Nobody is going to be sitting at it doing updates when an alarm comes in. The beauty of it is that it's so simple. You cannot mess it up."

Travtech is releasing a complementary product for the boundary network in the first quarter of this year.

Performance monitors

Whereas operations monitoring provides an indication of whether the network is delivering service to the end user, performance monitoring takes the process a step further to indicate how well the network is performing its service delivery.

It indicates the state of health of the network and the rate at which messages are delivered to the end user.

Managing the performance of a network is dependent upon monitoring three key areas: network component utilization, traffic statistics and response time.

Monitoring the utilization of network components — such as the TCU buffer and cycle capacity, transmission media and CCNs — as well as traffic statistics, such as link error rates and message retransmissions, provides the network manager with enough information to diagnose, as well as predict, the health of the network.

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>
> BLAKE WOOD
> CHEVRON INFORMATION TECHNOLOGY CO.

With this information, the network manager is not only able to take action to cure an unhealthy network but also to evaluate how much energy is left in a healthy one.

The network manager uses this information for three purposes. First, in order to ensure that an adequate level of service will continue, he must know how much reserve resource is available in the network components.

Network components do not degrade gracefully. A critical component such as a TCU can operate at full throughput capacity until it suddenly reaches a buffer threshold and abruptly turns a normally functioning network into one that, for all intents and purposes, is down.

Second, this information plays an essential role in performance problem diagnosis and resolution.

An irate user's complaints of poor response time can be treated immediately if performance information shows that a TCU is out of resource or is attached to a line with an inordinately high number of errors.

Third, this information, along with other traffic rates, plays an essential role in a network capacity planning strategy.

Response-time monitoring is the most important aspect of performance management. It is the yardstick by which the end user evaluates the service he receives.

It does a network manager little good to tell an end user that the TCU is using only 20% of its buffers or that its local link is operating at less than 10% utilization if the end user is experiencing a 14-second response time.

Response-time measurement is not exclusive to performance management; it is used in operation management as well. However, the operation management focal-point applications mentioned so far have limited ability in reporting it.

The source of response time information for both Netview and Net/Master is IBM's RTM, which is provided by a board that may be installed in a CCN.

RTM does, however, have some shortcomings. While it runs on most of IBM's CCNs, it does not run on plug-compatible CCNs. It also does not break response-time value into its host and network components, and it is difficult to get information at the application and transaction levels. In short, RTM is useful mainly to verify service-level complaints from an end user on an IBM control unit outfitted with the RTM feature.

While certainly a useful function, this is by no means the ultimate in response-time analysis procedure. To be fair, IBM does not claim that it is.

It considers RTM to be a sentinel, an early warning system of response-time problems, while other products it offers allow investigation of the problem.

Response time is the single most important measurement that the network manager makes, so it is not surprising that many vendors offer products to report on response time. There are both hardware and software approaches to it. We will first look at software approaches.

Software monitors

IBM released the Network Performance Monitor (NPM) in 1985. The product runs as a VTAM application and under the OCA as a focal-point application. It monitors network component utilization, message statistics and response time — the three areas necessary for a complete strategy of performance management.

NPM integrates two formerly independent products, Network Performance Analyzer (NPA) and VTAMPARS. The NPA process is now referred to as Network Data Collection and Analysis. The VTAMPARS process is known as Session Data Collection and Analysis.

The NPA, or network, data has a collection mechanism that resides in NCP and, at user-defined intervals, sends files to an application in the host. This application formats the data to SMF formats.

Information is provided on network component utilization, including TCU cycle and buffer usage, link utilization, link error counts and path information unit counts between applications and TCUs, CCNs and terminals.

This data is provided in an SMF format (record type 38) or in a BSAM format. The BSAM-formatted data is for on-line viewing.

The VTAM, or session, portion of the NPM handles messages as they flow through VTAM on their path between host application and end user. The VTAM session file provides information on message rates and sizes and, most important, on end-user response time. This data is written to a VSAM file.

Alternative vendors in this arena include Chicago-Soft Ltd. — maker of Netspy — and Uccel Corp., which recently purchased Mazda Computer Corp.'s Mazdamon (see story page S13).

There are two major drawbacks to using a software monitor to measure response time — the necessity of implementing definite-response mode and the amount of direct-access storage device (DASD) required to store the information.

Definite-response mode is an SNA request/response protocol that takes place at the upper layers of the architecture and that ensures that data communications among network end users takes place in an orderly fashion.

This mechanism is not to be confused with link-level responses, which take place at lower layers of the SNA and keep track of frame sequence numbers in link headers and trailers.

Definite-response mode functions as follows: When VTAM receives a message from an application destined outbound to an end user, it checks to see if the application has requested that definite-response mode be implemented.

If definite-response mode has been requested by the user, VTAM sets the appropriate bit in the transmission header of the outbound message. When the message is received by the CCN of the receiving end user, the bit is decoded.

> RESPONSE time is the single most important measurement the network manager makes, so it is not surprising that many vendors offer products to report on it.

The CCN will respond to the next inquiry for inbound traffic with a response frame that includes the sequence number of the last message received from the application.

When the application receives notification of the successful receipt of the message, it is then free to send additional messages to this end user.

Software monitors, through the implementation of a VTAM trace facility, can take advantage of this mechanism to monitor response time. When VTAM sends the message outbound, it may issue a time stamp.

When it sees the response frame come back, it issues another time stamp. VTAM has captured the entire network delay, including outbound transit and wait times, poll-wait time and inbound transit and wait times.

It should be pointed out that the inbound transit time of the response message will differ from the inbound transit of an end-user data message as the size of the inbound data message increases.

VTAM may perform a similar function as the data message enters the host and I/O area inbound and when it exits, therefore capturing host time as well.

Software monitors can take advantage of this facility by requiring that the VTAM trace facility be turned on and then by reducing the information produced to report formats to indicate host and network response time.

There are two negative aspects usually associated with running in definite-response mode. The first is heavy overhead on the network as a result of the additional response messages being generated.

Actually, the added overhead has been measured extensively and found to be negligible. The extra control message flowing through the network for each user message does not measurably affect performance.

The second perceived problem is overhead in host cycles, which is incurred in processing the response message. This issue has also been found to be fairly negligible, although shops with common storage area constraints have experienced problems when using some software monitors to handle a large number of users.

While these two issues associated with implementing definite-response mode are actually non-issues, one major nontechnical problem does exist.

In order to turn on definite-response mode, the network manager must request assistance from mainframe systems personnel. For example, if a network manager wishes to turn on definite-response mode for CICS, the CICS systems programmer would have to be involved in the process.

And what systems programmer would not balk at twiddling with an application that was up and running fine? No one could be blamed for hesitating to jump in as requested, yet this reluctance is usually the main roadblock to implementing definite-response mode and gathering response-time statistics with a software monitor.

It is usually the case that IMS applications have definite-response mode turned on under

Continued on page S21

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Controls

FROM PAGE S19

normal operations, and CICS applications do not. TSO has it turned on under normal operations, but some monitors are unable to use the information.

The second objection to using a software monitor to gather response-time statistics is the amount of DASD resource required.

How much DASD is too much?

One large insurance company is currently using Uccel's recently purchased Mazdamon to measure response time for all 15,000 terminals in its network. The company has two dual-density IBM 3380s dedicated to supporting the Mazdamon libraries and the response-time data. Most sites, however, would consider this amount of resource unacceptable.

"No one has defined what is an appropriate amount of host resources to use to support these network management processes," Chevron's Wood says. "Host performance people think anything is too much.

"Obviously, as a network manager, I have a different opinion," Wood continues. "Could we justify dedicating a couple of 3380s to gathering response-time information? I think that would be considered definitely too much resource. But things change pretty quickly in the network area. Check back with me in a year, and you might find that solution implemented here."

One solution to the DASD problem is to monitor selectively — to turn the collection mechanism on only for certain users or for short lengths of time. This is a workable alternative, but most network managers agree that the aim of this strategy is to provide a continuous awareness of everybody's response time.

Hardware monitors

The hardware approach to monitoring response time sidesteps the problem of definite-response mode and DASD usage, but it is not without its own drawbacks.

A hardware monitor is a stand-alone device — a mini or cluster of microcomputers — that interfaces to the network through a monitoring unit at the digital interface between the TCU and the modem.

Information is formatted for reporting and inclusion in a data base at a terminal that is local to the monitoring unit, or it is forwarded to mainframe software for manipulation in the host.

The hardware monitor passively views all data that travels over the network. It is capable of producing reports on end-user response time, utilization of transmission media and traffic statistics, but it does not report on TCU usage.

The sophistication of hardware monitors ranges from microprocessor-based, single-line monitors to large minicomputers tied to data bases. These are capable of monitoring more than 1,000 lines simultaneously.

One of the considerations when implementing a hardware solution for response-time monitoring is cost. While a single-line monitor can be purchased for a few thousand dollars, a system that would monitor all of the users at a large site could easily climb into the quarter-million-dollar range. Many shops are caught between the expense for DASD with a software approach and that of implementing a hardware approach.

THE cost of a system that would monitor all of the users at a large site could easily climb into the quarter-million-dollar range. Many shops are caught between the expense for DASD with a software approach and that of implementing a hardware approach.

Aside from cost, a major complaint about hardware monitors is their degree of resolution when delineating between host and network components.

Since a hardware monitor is positioned between the TCU and the transmission medium, it sees as one block of time the time the message spends in the host and the TCU. The time the hardware monitor reports as host time actually includes host and all of the time spent in the TCU — such as the bit transit delay, data translation time and link queue wait time.

The inability to determine whether a bottleneck is occurring in the host area or in the TCU area is a serious impediment to problem resolution. To solve this, some companies use software monitors on a selective basis to break out the response time between host and TCU after a hardware monitor has indicated a problem.

An additional objection to hardware monitors is generated by managers who see them as external to network management strategy. Waltrip of The Travelers is one network manager who voices this concern.

"We brought all of the major vendors with a hardware approach to the problem in here and took a good look," he says. "The reason we favor an integrated software approach instead of a hardware approach is that then the management system becomes part of the system, not an appendage to it."

Continued on page S22

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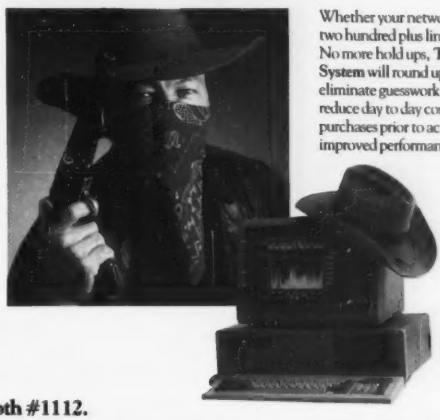

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DIAL-INQ READER SERVICE NUMBER 15

Control

FROM PREVIOUS PAGE

The good news about hardware monitors is that the cost is coming down and that they continue to take advantage of new technology. In 1985, Dataswitch Corp. announced a top-of-the-line monitor for 25% to 40% less than competitive products. Within a year, prices among all the leading vendors again approached par.

Wallace T. Finney, vice-president of Emcom Corp. in Dallas, a vendor of the NCS70 network monitoring and control system, says, "We've been able to take advantage of new technologies and of the cost decrease in some of the components. Monitors are easier and cheaper to build, and we've been able to pass savings along to our customers."

Last year, Dynatech Data Systems announced its Prism system, which represented yet another advance. For the first time, each line port on the monitoring unit was controlled by an independent processor. Before this, each four-port board was controlled by a single processor.

This means a single board can now support multiple protocols, and more throughput can be handled by each monitoring port. Other vendors can be expected to match this flexibility and throughput.

Capacity plannning

Once the network is operating in a reliable manner and delivering service within expected limits, management concerns turn toward the future.

The network manager is managing a resource that is in a dynamic state. He faces a constant influx of user requests for new features and functions and must evaluate the appropriateness of integrating new technologies into the system while also responding to the increasing number of users accessing the network. Without a method to plan for the future, the network manager will be overwhelmed.

Tom Krpata, network product manager at BGS Systems, Inc. in Waltham, Mass., says, "The old methods of planning, if they can be called that, don't work today. We used to bring a bunch of new users on-line and see what happened. If response time went south, which it usually did, we scrambled and tried to fix it. Today, the work going through these networks is too critical. In the time we're scrambling, the network manager could be fired."

A sound strategy of capacity planning allows the network manager to evaluate the impact of changes to network hardware, software or the number of users before the changes are actually implemented.

> "MONITORS are easier and cheaper to build, and we can pass savings along to our customers."
>
> WALLACE T. FINNEY
> ENCOM CORP.

Given the critical nature of the information flowing through today's networks, it is essential that new users are brought on-line under existing service-level criteria and that existing network users who are sharing network resources with the new users are not adversely impacted.

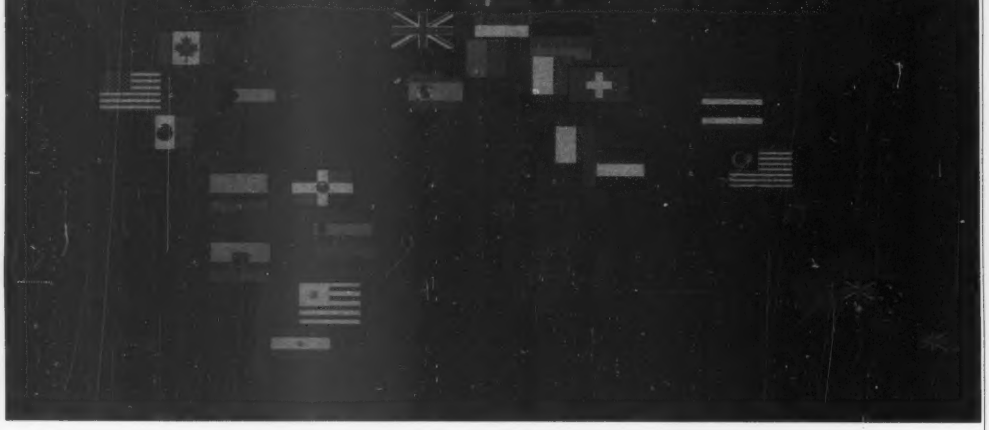
"We believe in optimizing our fire fighting method by a sound operational and performance management strategy," Centel's Vidlak says, "but what's equally important is fire prevention — a sound network capacity planning strategy."

Network models are usually developed either to provide information on the performance of a network, with less concern given to the geographic design of the transmission media and devices and the costs associated with that design, or else the exact opposite.

Network performance models may be used to answer the following types of questions:

- What will happen to the response time and the message throughput if two more CCNs, with 10 terminals each, are added to a line that already supports

MORE THAN 13,000 PCs & PC NETWORKS WORLDWIDE THINK THEY ARE IBM SYSTEM/3x MINICOMPUTERS.



These inexpensive PCs are running the same RPG II software as expensive System/36s & System/34s. They have all the compilers and attendant modules to replicate the RPG II minicomputer environment.

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DIAL-INQ READER SERVICE NUMBER 16

Performance Monitoring Products

COMPANY/PRODUCT	SYSTEM BASE	PROCESSOR BASE	Utilization measurement: OF INTERMEDIATE NETWORK	Utilization measurement: AT APPLICATION TRANSACTION LEVEL	Utilization measurement: REQUIRES DEFINITE-RESPONSE MODE	Response-time measurement: FOR TCU	Response-time measurement: FOR LOCAL LINK	Response-time measurement: FOR INTERNODE LINK	REPORTING MECHANISM	REPORTING GRAPHICS FACILITY	REPORTING GRAPHICS SOFTWARE	HISTORICAL DATA BASE REPORTING	MICS INTERFACE	FULL SCREEN PROMPTS	USER HELP SCREENS	LINK-LEVEL DIAGNOSTICS	SUPPORT FOR NON-IBM PROTOCOLS	SUPPORT FOR VM OPERATING SYSTEM	READER SERVICE NUMBER
Avant-Garde Computer, Inc. (609) 778-7000 *Net/Alert*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	Yes	No	Yes	Yes	Yes	Yes	Yes	560
Chicago-Soft Ltd. (312) 525-6400 *Netspy*	Integrated	Mainframe	No	No	Yes	Yes	Yes	Yes	Mainframe	On-line	SAS	No	Yes	Yes	Yes	No	No	No	561
Data Communications Management Sciences (203) 838-7183 *Network Service Manager*	Stand-alone	Minicomputer	No	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	No	No	No	Yes	Yes	Yes	Yes	562
Dynatech Data Systems (703) 569-9000 *Prism*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	Yes	No	Yes	Yes	Yes	Yes	Yes	563
Emcom Corp. (214) 423-7183 *NCS70*	Stand-alone, integrated	Mainframe, PC	Yes	Yes	No	No	Yes	Yes	Mainframe	On-line	Proprietary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	564
IBM (914) 696-1900 *Network Performance Monitor*	Integrated	Mainframe	No	No	Yes	Yes	Yes	Yes	Mainframe	On-line	GDDM	No	No	Yes	Yes	No	No	Yes	565
Response Time Monitor	Stand-alone	N/A	No	No	No	No	No	No	Mainframe	Batch only	GDDM	No	No	Yes	Yes	No	No	Yes	
Intellinet, Inc. (203) 929-5899 *Intellinet 3200*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal, mainframe	On-line	Proprietary, SAS	Yes	Yes	No	Yes	Yes	Yes	Yes	566
Northern Telecom, Inc. (609) 596-2500 *PMM/4*	Stand-alone	Minicomputer	No	No	No	No	Yes	Yes	Internal	None	None	No	No	No	No	Yes	Yes	Yes	567
Questronics, Inc. (801) 262-9923 *Analycon*	Stand-alone	PC	No	No	No	No	Yes	No	Internal	On-line	Proprietary	Yes	No	Yes	No	No	Yes	Yes	568
Teleprocessing Products, Inc. (805) 522-8147 *TP270*	Stand-alone	Minicomputer	No	No	No	No	Yes	No	Internal	None	None	No	No	No	No	No	Yes	Yes	569
Tesdata Systems Corp. (703) 478-9320 *Smart System*	Stand-alone	Minicomputer	Yes	Yes	No	No	Yes	Yes	Internal	On-line	Proprietary	Yes	No	Yes	Yes	No	Yes	Yes	570
Uccel Corp. (416) 284-8091 *Maxidamon*	Integrated	Mainframe	No	Yes	Yes	Yes*	Yes*	Yes*	Mainframe	On-line	SAS	Yes	Yes	Yes	Yes	No	No	No	571

The companies included in this chart responded to a recent survey conducted by MGT Technology Group. Further product information is available from vendors.

* Available in first quarter 1987

about 100 terminals? Will upgrading the modem on that line counterbalance the additional users?

- Will the manipulation of SNA data flow control parameters allow more service to be squeezed out of a network?
- Some money can be saved by replacing my transcontinental lines with a satellite link, will this have much of an effect on response time?
- A new CICS application is going to be sending full-screen messages to the terminal users. Will the users' service be within the CICS criteria already set up?

A network design and costing model, on the other hand, would be more likely to answer questions like these:

- What is the best way to configure 500 users in a new department that is spread throughout the country?
- What is the most cost-effective manner of implementing multiplexers and remote TCUs in a network?

A model may employ simulation or analytical techniques. The major differences between the two lie in the amount of time they require for execution, their levels of accuracy and their abilities to report on statistical deviations.

Simulation

Simulation techniques are generally more accurate and take longer to execute, and they provide not only average response-time predictions, but allow statistical deviations to be reported as well.

For example, a user could produce a report with a simulation model that would indicate the average response time expected would be six seconds but that 95% of the transactions would have a response time of less than 9.5 seconds.

This information is necessary to setting service-level agreements. Service-level agreements usually designate a guaranteed response time that will be delivered for a certain percentage of the total number of transactions.

The faster execution time of analytic models is important in other kinds of situations, however. If one was modeling large networks with many paths and intermediate TCUs, the execution time for simulation models could run into hours, while an analytic model would run in minutes.

Input to the model is based on performance information gathered in operation and performance management strategies and on configuration information available in network system files, such as the NCP generation file.

Once information from network operations, performance and planning has been gathered, it is desirable to bring it to one central repository. This is preferable, not only for the obvious reasons of organization but for easing the job of analysis as well.

Tasks such as network accounting, chargeback and auditing may require the integration of information as diverse as component failure rates, response times, throughput rates, general system availability and configuration information. A central data base can provide this integration.

Some sites have attempted to design and construct their own network data bases, but most have chosen to use existing commercial performance data bases, such as Morino Associates, Inc.'s Morino Information Control System, Merrill Consultants' MXG and Peregrine from Peregrine Systems, Inc. This route offers the advantage of allowing the integration of network data with information from other areas of the information system so that true information system management can take place.

Personnel

A network is as good as its management strategy, and the management strategy is as good as the people who implement it.

Networks may be the main evidence in the verdict against the idea that a good manager can manage anything.

As vice-president of telecommunications at The Travelers, Waltrip is responsible for an international network consisting of more than 40,000 terminals. And while Waltrip has sound management credentials, his background is in engineering. Does he think that a good manager, without a communications background, can successfully manage a telecommunications group?

"No I do not," he says. " It's one of the worst mistakes management can make. The thing you need most in this role is a

Capacity Planning Models

COMPANY/PRODUCT	TECHNOLOGY BASE	PROCESSOR BASE	PRIMARY OBJECTIVE	Modeling capabilities: END-USER RESPONSE TIME	INTERMEDIATE NETWORK RESPONSE TIME	SNA PERFORMANCE PARAMETERS	INPUT PROCESS	INPUT SOURCES (IBM STANDARD/OTHER)	LEAST-COST ROUTING FACILITIES	INTERNAL ROUTE TARIFF TABLES	REPORTING METHODS	REPORTING GRAPHICS SOFTWARE	FULL-SCREEN PROMPTS	USER HELP SCREENS	READER SERVICE NUMBER
Ack Computer Applications (919) 467-7279 *Tops*	Hybrid	Mainframe	Performance planning, cost analysis	Yes	Yes	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	None	No	No	572
Aries Group (301) 762-5500 *Aries System*	Simulation	Mainframe	Cost analysis	Yes	No	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	None	No	No	573
BGS Systems, Inc. (617) 891-0000 *Best-1/SNA*	Analytic	Mainframe	Performance planning	Yes	Yes	Yes	Automated	IBM standard packages	No	No	Average/mean	SAS	Yes	Yes	574
Connection Telecommunications, Inc. (617) 584-8885 *MNDS*	Simulation	PC	Cost analysis	Yes	No	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	Proprietary	No	No	575
Contel Information Systems, Inc. (516) 829-5900 *Mind*	Simulation	Mainframe, PC	Cost analysis	Yes	Yes	Yes	Manual	IBM standard packages, others	Yes	Yes	Average/mean, statistical deviation	Proprietary	No	No	576
IBM (919) 836-5110 *Snapshot*	Hybrid	Mainframe	Performance analysis, cost analysis	Yes	Yes	Yes	Automated	IBM standard packages, others	Yes	Yes	Average/mean, statistical deviation	GDDM	No	No	577
Topaz	Hybrid	Mainframe	Performance analysis, cost analysis	Yes	Yes	Yes	Automated	IBM standard packages, others	Yes	Yes	Average/mean, statistical deviation	GDDM	No	No	
MGT Technology Group (617) 890-0303 *Analyzer Products*	Simulation	PC	Performance analysis	Yes	Yes	Yes	Manual	IBM standard packages	No	No	Average/mean, statistical deviation	Proprietary	Yes	Yes	578
Network Synergies, Inc. (317) 497-2755 *Star*	Simulation	PC	Performance analysis, cost analysis	Yes	No	No	Manual	Other	Yes	Yes	Average/mean, statistical deviation	Proprietary	No	No	579
Performix Software Corp. (415) 969-3399 *NETPX*	Simulation	PC	Performance analysis	Yes	No	No	Manual	IBM standard packages, others	Yes	No	Average/mean, statistical deviation	Proprietary	No	No	580
Technetronic Inc. (703) 749-1471 *Explicit SNA*	Analytic	PC	Performance analysis	Yes	Yes	Yes	Manual	IBM standard packages	No	No	Average/mean	Proprietary	Yes	Yes	581

The companies included in this chart responded to a recent survey conducted by MGT Technology Group. Further product information is available from vendors.

basic understanding and feeling for systems engineering. You have to have spent a lot of time designing large systems and know how to think systems. Without that understanding, it's very difficult to take a lead in the technology. It's not a management issue so much as it is one of guiding the technology."

Waltrip adds that having competent management is only the first step. Recruiting a staff of 50 or so people with adequate expertise, he says, was no easy chore. Well-qualified people are not easy to find, he says, noting that it took him about two years to get his group fully operational, even though, after 35 years in the field, he is better connected than most network managers.

"It is no secret that network expertise is at a premium," Waltrip says. People supplying the products complain the loudest about the inadequate network staffing at many shops.

Peter McLaughlin, president of Chicago-Soft explains why. "Probably the main objection we all face in this market to purchasing our products is that sites don't have the people to use them. What we have to get across is that our products actually cut back on the need for people to run the network."

Although products that leverage personnel's time alleviate the staffing problem, most people trying to staff networks perceive that the networks are growing faster than the supply of competent workers.

Expert systems

While some people seek deliverance from technology through the workings of even more technology — expert systems and artificial intelligence — most network managers are skeptical about nonhuman solutions.

Many network managers say that the operations of a network are too critical to be entrusted to an expert system. When asked, "Would you use a network expert system?" a typical comment is, "I've been in telecommunications for more than 15 years, and I still don't have all the responses to a situation straightened out in my head. You think I'm going to trust a group of programs to do it right?"

Andrew Levine, senior knowledge engineer at Bachman Corp. in Cambridge, Mass., responds to such apprehensions by saying, "You can implement a network expert system at whatever degree of automation you choose. The network manager should demand that the expert system has the ability to explain and justify its actions before they are carried out.

"So an expert system could operate on the first level of automation: 'Here's the problem, here's my diagnosis and here's what you can do,' " Levine continues. "If the network manager agrees, then the expert system can be instructed to implement the solution. A second level might be: 'Here's the problem, here's what I diagnosed and here's what I'm doing. I will continue unless told otherwise.'

"The highest level could do everything and then just print out a report. But the network manager should realize he's still always in charge," Levine says.

AI and the network will have to make friends, Levine says, because the size and complexity of network systems has grown to a point at which a single person has difficulty understanding its entire scope. Expert systems technology will not only assist the network manager in reconfiguring parts of the network, but will also tell him the global impact of the changes.

Successful implementation of these strategies of operations, performance and planning will allow the network manager to ensure that the network will fulfill its crucial role in the delivery of information throughout the corporation.

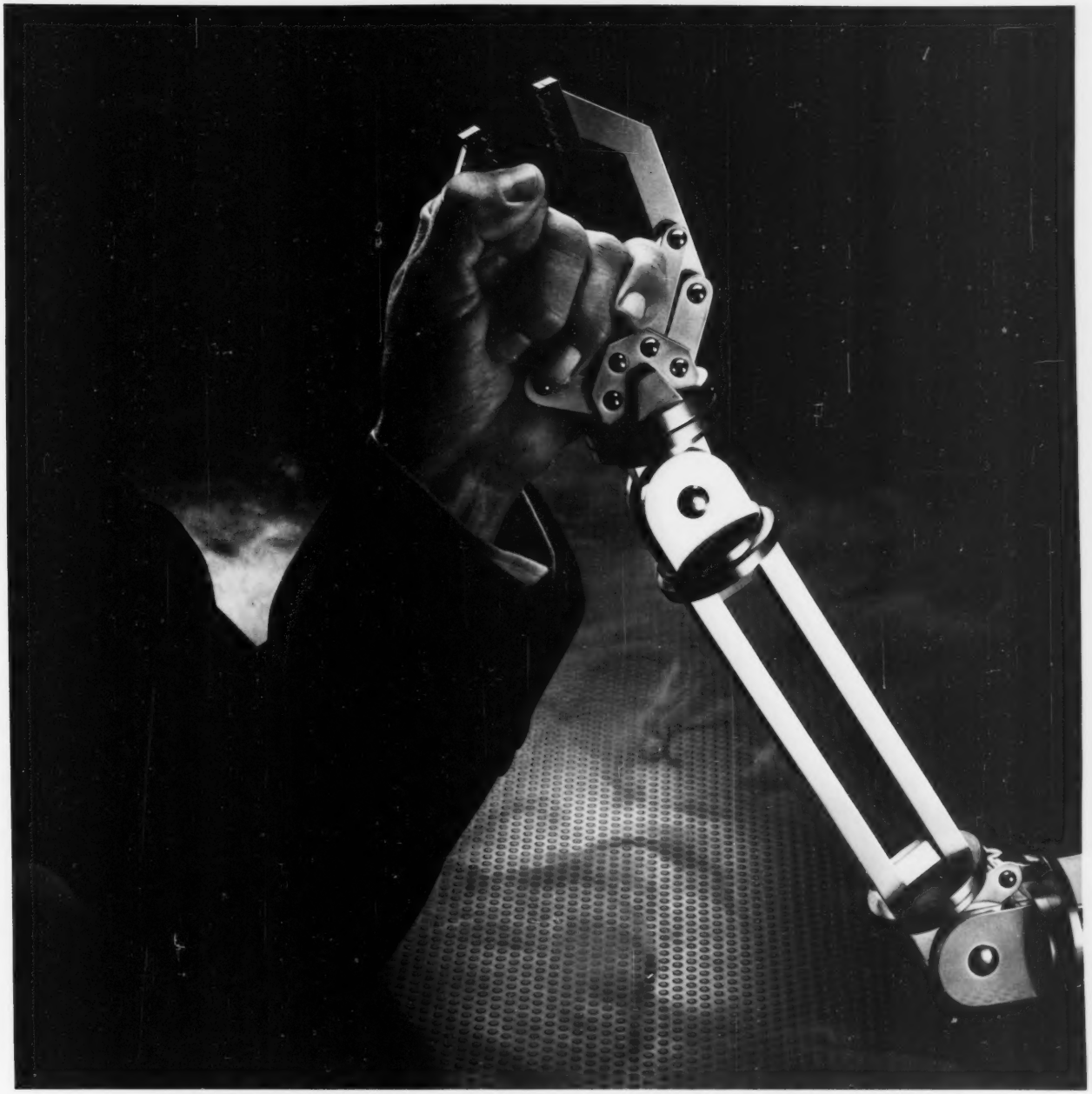
Global integration

When all the pieces of the network strategy are pulled together, the network manager will find he is providing a component of the information system in a reliable and consistent manner. But it is still only a component. The end user is not properly served until all components of the entire information system are providing this reliable and consistent service.

Many technicians in other areas of the information system have already realized the need for this sort of global integration. Robert Ashton, president of DB View, Inc. in Waltham, Mass., a leading supplier of IBM's relational data base DB2 products and services, says, "I work with some of the largest corporations in the world, and a number of them are currently dedicating tremendous resources at great cost to make information available through centralized and distributed data bases.

"It's important," Ashton says, "that these companies keep an overall view of the information system during this data base development. Without other components of the information system — like the network — holding up their end of the information delivery system, the most sophisticated data bases are going to sit mute."

It is not enough for a network manager to produce sound management strategies for the network. He must also maintain communications channels with his counterparts in complementary areas of information system management. Only in this way can technological advances combine to produce an authentic "period of brilliance" in information management.



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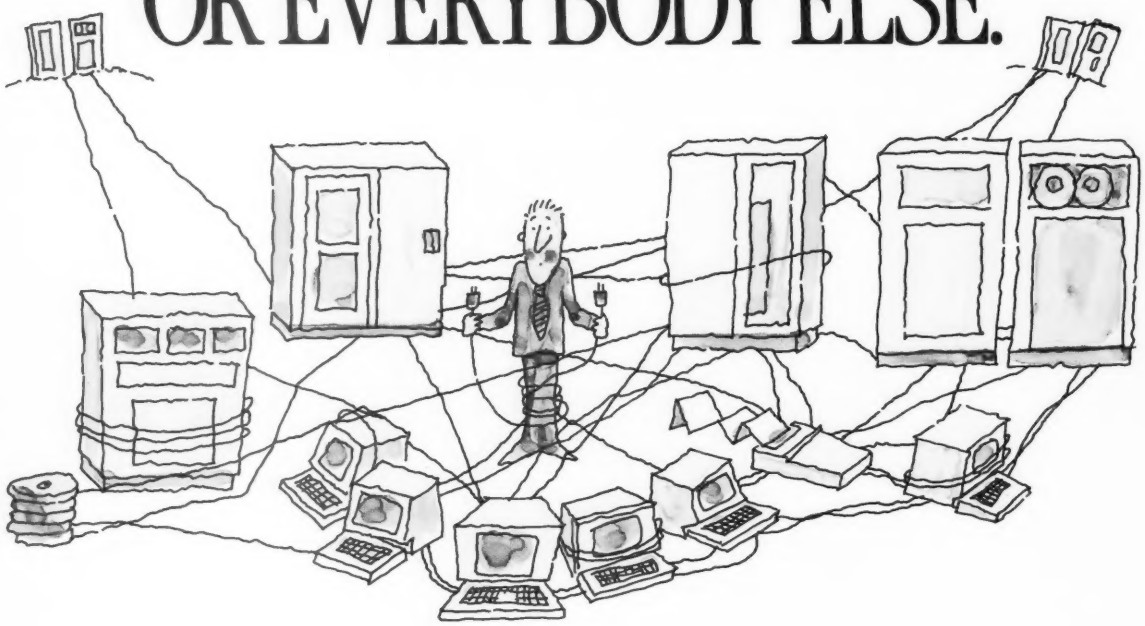
IN CORPORATE NETWORKING, IT'S BANYAN OR EVERYBODY ELSE.



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Price Waterhouse boosts micro penetration to 31%

Top management insists on corporate microcomputer standards and enterprisewide training from Day 1

BY JEAN S. BOZMAN

Paper. The process of auditing a Fortune 500 firm generates thousands of pieces of paper. Tax returns, audit trails, working papers — all are the handiwork of the dozens of accountants who must verify a major corporation's financial statements.

Until the advent of the microcomputer barely five years ago, there was no way around all that paperwork and the trouble it took to keep it all organized.

In the 1980s, many of the Big Eight accounting firms — notably Peat, Marwick, Mitchell & Co. and Coopers & Lybrand — have attempted to incorporate microcomputers into their own operations.

But at least one Big Eight firm, Price Waterhouse, realized that incorporating the use of microcomputers into its infrastructure could sharpen the company's competitive edge.

While not the biggest of the Big Eight, this company perhaps has gone the furthest in distributing micro technology throughout its far-flung operations in 96 U.S. offices and 99 countries throughout the world. Price Waterhouse has always viewed itself as a company that gives its clients — which include such multinationals as IBM, Exxon Corp. and Amoco Corp. — a premium service. The firm's motto is, "Expect more from us."

For every desk a micro

After experimenting with Tandy Corp. TRS-80s in 1981 and 1982 and then working to exploit IBM's Personal Computer, Price Waterhouse management came to believe that the technology should be spread throughout the organization.

Price Waterhouse's operations are divided into three divisions: Audit and Accounting, Tax Services and Management Consulting Services (MCS). Donald Smith, an MCS partner, estimates that Price Waterhouse maintains 3,000 personal computers throughout its U.S. operations for its 700 partners and more than 8,500 other employees — roughly one micro for every three professionals. The aim, he says, is to put a PC on every desk by the 1990s.

As Richard McKnight, another MCS partner, observes, "Micros are continuing to grow in their usefulness, and they make the smart person more productive."

STAN KAPPRIS

Price Waterhouse's *Richard McKnight (r) and Donald Allen*

> "WE HAVE to go back to the principle that we are a firm whose main asset is its people. Training on micros is part of an ongoing commitment to keep our staff current. . . . It's worth the cost."
>
> RICHARD MCKNIGHT
> PRICE WATERHOUSE

To ensure that the micros were well dispersed and well supported, top management standardized the technology, meaning that wherever a Price Waterhouse accounting or tax team travels in the U.S., it can expect to find the same IBM PCs, Personal Computer ATs and Compaq Computer Corp. 286s.

The members of the tax division, as well as MCS staff, use a pair of Apple Computer, Inc. Macintoshes to develop graphics and slides for presentation. The two Macs, alone in an office full of IBM PCs and PC compatibles, survive because of their unique bit-mapped capabilities, which suit them for the development of audiovisual aids. A few laptops are used for field visits, demos and plane trips, but generally people would rather haul the portable Compaqs, which weigh more than 20 pounds each.

As with the hardware, software is standard, too. Some tools are off-the-shelf packages such as Lotus Development Corp.'s 1-2-3; Javelin Software Corp.'s Javelin spreadsheet product; Borland International's Reflex, the Analyst; Cosmos, Inc.'s Revelation; and Ansa Software Co.'s Paradox data base management system. Others are written internally by the consulting and tax divisions.

The Corporate Computer-Assisted Tax Services (CCATS) group, for example, employs dozens of programmers to write micro-based programs for the tax division. MCS often dispatches special teams of programmers to develop a custom micro package for one of Price Waterhouse's corporate clients. Many of these programs contain self-conducted training sessions. One of the firm's standard accounting tools, the Audit Practice Support System, contains a built-in training module for first-time users, complete with menus and prompts.

Accountants' productivity

The best feature of this end-user PC-focused strategy is that it boosts accountant productivity, allowing, for example, tax professionals to build up tax statements for entire divisions in a matter of several hours. In the process, such programs consolidate data, combining many paperwork steps on a single floppy disk.

In addition, this strategy allows Price Waterhouse to move to the forefront of leading-edge technologies. Because the firm purchases a significant number of micro products — and wields some influence over its clients' purchases — it offers vendors an

Bozman is *Computerworld's* Midwest correspondent.

ideal site for beta testing of new hardware and software. The firm often receives early shipments of new products as well; it was one of the first recipients of Compaq's 386 computers. Similarly, IBM provided Price Waterhouse with a preview of its PC Convertible through a nondisclosure agreement six months before its release.

Two-way communication

A microcomputer steering committee — consisting of Chairman McKnight, Smith, partners John Zembron and Robert Odmark and Thomas Green, director of computer services at Price Waterhouse's National Administrative Center in Tampa, Fla. — meets quarterly in Tampa to discuss microcomputer issues. This committee, in existence since 1983, was formed to help coordinate, set standards for and give feedback on Price Waterhouse's computer strategy and to discuss new products coming into the market.

The members of the microcomputer committee also speak to each other weekly by telephone to respond to emerging issues. Jay Levine, director of Price Waterhouse's Computer-Assisted Tax Service (CATS), says that similar conversations with his counterparts in the UK, Canada and Ireland also take place by telephone. Price Waterhouse's U.S. partnership, although distinct from its foreign operations, depends on overseas offices' providing data about international and multinational clients.

The results of these conversations among micro managers are often printed in the tax division's monthly newsletter. The publication, "CATS Update," includes software reviews, a feature on tips and techniques and hardware updates.

The communication concerning micros is not one-way, however. In fact, feedback from staff and partners alike is expected. "We keep the communications going both ways," says Levine, who is based in New York. "In every regional office there is a point person to whom we send new software. That person is responsible for local distribution of software within that office." The point person is also in charge of directing complaints, problems and feedback on micro matters to Levine and his four assistants — all of whom were rotated from regional offices for a two-year tour at Price Waterhouse's New York office.

The firm's 90 regional offices are routinely polled by end-user support specialists to see if the offices are having any trouble with the micro technology or its accompanying software. If an office runs into difficulty, software support personnel are able to look at the user's micro screen by running Meridien Technology, Inc.'s Carbon Copy package on micros at both ends of a telephone line. This kind of remote diagnostics speeds installation of both off-the-shelf and custom software products at either a client site or another Price Waterhouse office.

Some of the micro software, such as the tax division's Tax Management System (TMS) package, takes into account the necessity of moving client data from a mainframe into the series of local-area networks (LAN) — including networks from Novell Corp., Banyan Systems, Inc., IBM, Sytek, Inc. and Ungermann-Bass, Inc. — at Price Waterhouse. The mainframe data can enter the networks through a variety of entry points.

One convenient entryway is through a tape-to-hard-disk converter at Price Waterhouse's Chicago office. To use it, the client simply ships mainframe data on a standard 12-in. tape to Price Waterhouse for conversion. Another gateway is provided by a series of micro-to-mainframe software links that allow mainframes to share data on-line with high-capacity file servers scattered throughout Price Waterhouse's largest offices in New York, Chicago, Los Angeles and St. Louis.

At A Glance

Price Waterhouse

Founded: London, 1849
Revenue: $645 million (fiscal 1985)
Market share: No. 1 auditor for Fortune 500
Partners: 753 in the U.S.; 17,000 worldwide (99 countries)
Employees: 8,500 in the U.S.; 26,000 worldwide
Services: Accounting, auditing, tax, management consulting, merger and acquisition, actuarial consulting

INFORMATION PROVIDED BY PRICE WATERHOUSE AND THE "PUBLIC ACCOUNTING REPORT"

A more productive staff

Certainly, the increased use of micros helped Price Waterhouse cut down on paperwork. But, as a side effect intended by the company, the micro strategy also made the firm's partners and staff more productive.

"When Price Waterhouse made a formal commitment to spreading micros throughout the practice, managers and partners came up to me and asked to take a Compaq home with them on the weekend," notes Steve Owens, a senior consultant with Price Waterhouse's consulting division in Chicago. "Some of them said, 'I've got a million things to do in the office, so this is one less thing I have to do there.'

"A lot of partners take a very active interest in micros," Owens says. "We're not forcing the technology on people, but most of the partners who wanted to learn have learned."

Richard Highberger, a partner in Price Waterhouse's tax division and manager of CCATS in Chicago, finds the company's micros very useful. "The first thing I do

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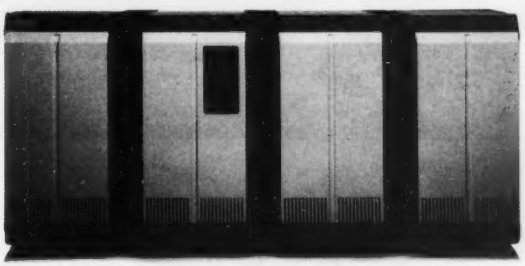

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when I get to the office is turn my machine on," he says. "Then I read administrative memos from other managers in the company and write memos back to them.

"I very rarely make changes to a program or report on hard copy any more," Highberger says. "I do all my editing on-screen."

Distributed technology

Micros figure prominently in day-to-day work at Price Waterhouse. In the Chicago office alone, more than 200 micros are available for 350 staff members. Dozens of software packages are also available to anyone who needs them. If the equipment or software is not on an employee's desk, he can check it out from what acts as a lending library at the office.

Judy Solochek acts as microcomputer coordinator for the Chicago office. "We log the equipment in and out, just like a lending library," Solochek says. "People call me if they want to reserve equipment and then it's assigned out on a priority basis."

Solochek uses Borland International's Reflex micro DBMS package to track all micros lent to the staff and all software distributed from the Chicago office's cache of micro supplies.

For off-site visits, auditors often make the lending library their first stop. They must check out portable Compaq micros and blank floppy disks from this central point and are accountable for hardware and software in their possession.

Such supervision of micros fits in neatly with Price Waterhouse's MIS directives, which require both widespread distribution and oversight of microcomputer technology. "It's unreasonable to think that we can mandate the end user's choice of software and hardware," McKnight says. "But we try to provide the right kind of software to our accountants and tax professionals so they can turn their attention outward to our clients — not inward, worrying about how to do work on their micros."

Software that complies

Many times, the right kind of software is on the shelf — 1-2-3, Carbon Copy, Reflex and other packages. But some of Price Waterhouse's challenges are unique, explains McKnight, who is also national director of professional software development. And that is where a software staff numbering in the hundreds comes in.

Levine's New York-based CATS group, Highberger's CCATS group in Chicago and McKnight's group in Tampa are all charged with writing software solutions that cannot be bought in any retail outlet. For example, CCATS developed the TMS package, which helps tax professionals create financial statements that call attention to irreconcilable balance sheets.

"TMS gives tax professionals the ability to perform the basic tax accounting necessary for compliance with federal regulations," Highberger says. "We've set TMS up so that it looks like a spreadsheet. We use our attached local-area network disk servers to provide the data base that builds these spreadsheets."

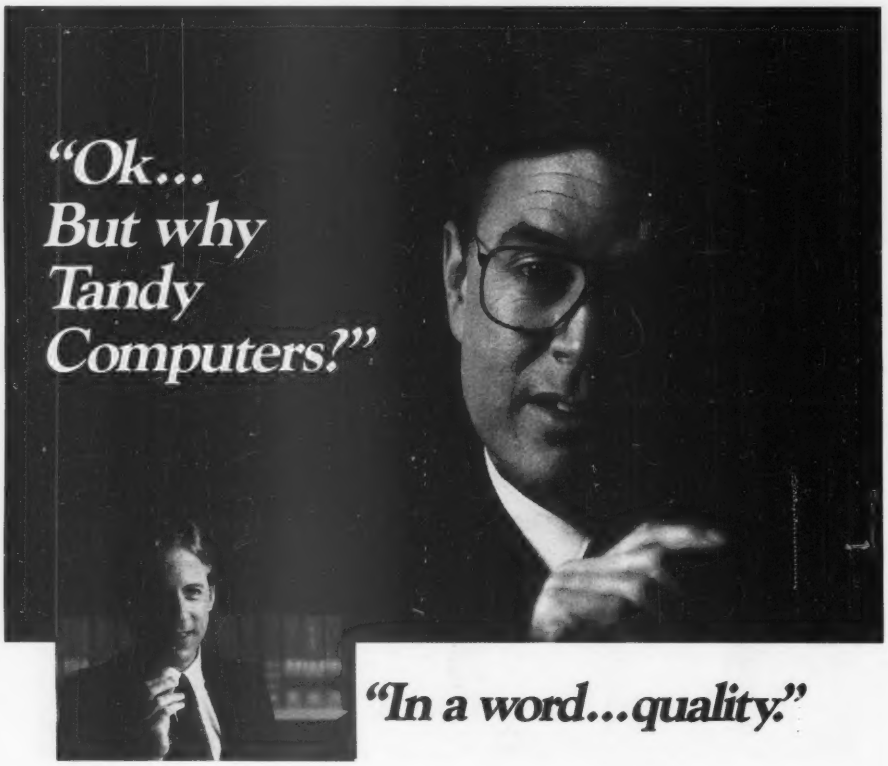
Best of all, the system is designed to be user-friendly. TMS makes use of eight colors on a PC AT to highlight the cursor position and to point out figures that do not reconcile. Pop-up windows show the work sheet calculations that support each set of revenue or earnings figures.

"It's designed so that a tax professional can come in and use the power of the machine without becoming a programmer first," Highberger explains. "TMS uses prompts and menus, and it's all laid out logically, in the same way that a tax professional does his work on paper."

Until now, most microcomputer software development at Price Waterhouse has been done in Microsoft Corp. MS-DOS, IBM PC-DOS and in Basic. But McKnight, for one, is seriously considering adding Unix and the C language to that list. The development machine would not be an IBM PC, but rather a Digital Equipment Corp. Microvax minicomputer.

"Up to now, every micro operating system we've used has given us the functionality we needed," he says. "But now we're finding that speed in our software development is a requirement, too." Using C, experienced Unix developers can develop source code quickly and then do the small job of recompiling the code to get it to run under the IBM machine's operating system.

MIS remains a distant backdrop for all microcomputer software development, McKnight notes, but it was not



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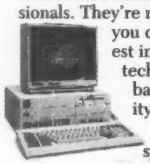
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always that way for Price Waterhouse end users. Before micros came along in numbers, Price Waterhouse's staff used Tampa's computing center as a time-sharing resource for compute-intensive calculations. Now MIS is free from supporting many of these end-user applications and can turn its attention to mainframe- and mini-based corporate administrative software.

Training from the start

Software like TMS is standard working equipment for Price Waterhouse accountants. Training in both micro hardware and software is mandatory and reaches to all segments of the company's operations.

"All professionals starting out with the firm are introduced to micros," Owens says.

"Everyone receives some training in Lotus 1-2-3, for example. Typically, our training is done in-house by Price Waterhouse people. Initial training in micros takes three weeks, but it continues throughout a person's career at the firm."

Depending on the employee's division and rank at Price Waterhouse, each staff member at the firm can learn the micro methodologies in a number of ways. Some may travel to Price Waterhouse's National Administrative Center, which houses the firm's MIS operations. Others are rotated through various home offices to accumulate special training related to their field — including the use of micros.

Each summer, Price Waterhouse sponsors a series of two-week training sessions at a conference center in Reston, Va. The program, called Tax/Select, is mandatory for the 1,200 Price Waterhouse personnel below the level of senior management in the company's tax division.

While microcomputer courses are just part of the summer-session course offerings, each staff member must take some micro courses during his tenure at Price Waterhouse. Senior managers and partners attend other in-service educational sessions at a four-day Tax Management Group Seminar held each October by the tax division in a major U.S. city.

Weighing the expense

The expense of such widespread training is great, amounting to hundreds of thousands of dollars for hardware alone. Yet, Price Waterhouse managers say, the results are worth the expense and the trouble of coordinating the microcomputer strategy.

"It's worth the cost," McKnight maintains. "We have to go back to the fundamental principle that we are a firm whose main asset is its people. Training on micros is part of an ongoing commitment to keep our staff current and literate on the state of their profession."

In Tampa, Price Waterhouse's computer center relies on a new IBM 3090 Model 150 and a DEC VAX 8500 as its primary production machines. The 3090 recently replaced a pair of older IBM 4381s. A number of other computers are also used, including systems from Honeywell, Inc., Hewlett-Packard Co. and Prime Computer, Inc. Many of these incompatible machines are maintained primarily to support accounting activities at client sites that use computers of similar architectures, Price Waterhouse managers say.

The data center is staffed by nearly 100 people — a large fraction of the Tampa office's total staff of 250 people. One day, MCS's Owens says, microcomputers will be manipulating most corporate data locally — either on a floppy diskette, an attached

SOFTWARE like TMS is standard working equipment for Price Waterhouse accountants. Training in both micro hardware and software is mandatory and reaches to all segments of the company's operations.

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hard disk or a file server on the LAN. But while PCs are widespread at Price Waterhouse, a lot of data still resides at the Tampa DP center.

As for software, MIS uses Software AG of North America, Inc.'s Adabase and Natural and IBM's IMS data base manager on the IBM mainframe.

According to CATS' Levine, computer managers are using these DBMS packages in conjunction with the IBM 3090 to build a corporate data base of tax facts that can be accessed by Price Waterhouse's tax professionals throughout the country via a dial-up time-sharing service. This codification of more than 4,500 tax facts is often based on electronic mail memos from tax managers, each dealing with a unique point of the current federal tax code.

The years spent ironing out the micro strategy have also rubbed off on Price Waterhouse's client practice, Smith says. "We try to identify how we can apply the new microcomputer technology to our consulting practice," he explains. "We have the opportunity to go into large companies and see how large systems are actually used at the worker level. The interesting thing about micros is that they're really being used as the worker's mainframe."

Push to downsizing

Price Waterhouse consultants show clients how, by spending money up front for micro hardware and software, they save in the long run. Smith pushes clients to explore downsizing — moving traditional mainframe applications down onto microcomputers. "For less than $30,000, a client could reap the benefits of millions of dollars in savings for mainframe hardware and software," Smith says.

"Through peer-to-peer processing, the PCs talk to one another, moving data back and forth," says Jarrad Bunch, an MCS manager, who spoke to Price Waterhouse clients at a recent Chicago-area seminar. "The mainframe further processes the data and sends back an appropriate response. This kind of application is not for everyone, but it does take us closer to the day when the mainframe is a file server and all workstations are intelligent."

CCATS' Highberger advocates the use of hard disks on all types of PCs at the firm to speed performance and also to allow users to capture data more effectively. The addition of hard disks to the microcomputers — along with the presence of high-capacity disk drives of 100M bytes or more on the corporate network — allow client corporations to ship mainframe data close to the Price Waterhouse consultant or auditor for later analysis on micro spreadsheets.

Price Waterhouse encourages its clients to move to micros for accounting applications. The firm sponsors seminars in regional offices and holds an annual seminar for clients.

When a client makes the move to microcomputers, Price Waterhouse finds its own auditing and accounting job made that much easier. All data for a particular audit can then be easily kept in a file of floppy disks, and the data the client inputs will easily feed into the Price Waterhouse accountant's set of software packages.

This is the area in which Price Waterhouse's consulting business and its traditional accounting services merge. Along with its in-house software, Price Waterhouse often develops custom software packages for its clients, offering to break off special development teams from its staff of programmers and charge clients for the professional time involved. MCS's Owens puts it this way: "I can develop a new system in three months that is cheaper, faster and more functional than many of the mainframe packages available to a Price Waterhouse client today."

> "THE INTERESTING thing about micros is that they're really being used as the worker's mainframe."
>
> DONALD SMITH
> PRICE WATERHOUSE

Riding the crest of technology

As for Price Waterhouse's own staff — about 10,000 in the U.S. alone — micros will become a standard tool of their trade, if they have not already. Price Waterhouse maintains two offices that do nothing but evaluate leading-edge technology, McKnight says. The Technology Assessment Centers, located in Palo Alto, Calif., and in London, are evaluating breakthroughs in such areas as artificial intelligence and voice recognition. When these technologies mature, they will allow individual micro users to do jobs that used to require several people and a mainframe.

"We think the coming crest of technology is going to have the greatest impact on professional services such as our own," McKnight says. "We think that the technology we'll be able to bring on-line in the next three to five years will significantly affect the kind of services we provide, and that means doing the job better and, often, with fewer people."

Fewer people at Price Waterhouse does not mean staff cutbacks are anticipated; rather, management expects the firm to grow through the use of micros. McKnight explains, "When we expand the amount of work we're doing, we won't do it with fewer people. Rather, the people we have will be more experienced, because we're allowing the computer to carry the burden of the calculations."

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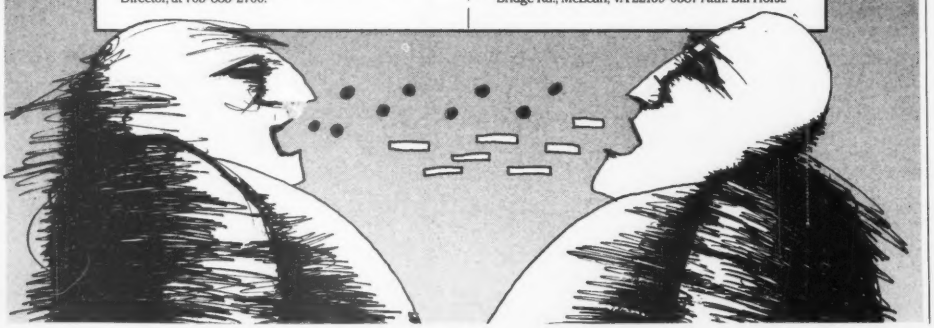

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MANAGEMENT

TAKING CHARGE

Jeffry Beeler

Product delay hurts MIS, too

Whenever a vendor announces a major product that later proves to be seriously flawed, industry watchers invariably wonder how the unforeseen setback will affect the company's short- and long-term fortunes. Seldom, however, do the same pundits devote a comparable degree of attention to the question of whether such hitches are likely to make life difficult for the product's intended users.

Yet any technological bug that delays a system's deliveries or detracts from its potential performance holds at least as many implications for buyers as it does for sellers. Few members of user organizations feel the impact of product-design foul-ups as keenly as MIS executives, who sometimes find themselves victimized by the goofs in ways that may not be immediately apparent to anyone else.

Consider, for example, the case of Darlene Litcher, information systems chief at the Oakland, Calif., office of the Department of Energy (DOE). Like most other users of Hewlett-Packard Co. equipment, Litcher holds HP in extremely high regard and is hard-pressed to find any major faults with the firm's products.

As one of the largest users of the vendor's business systems, the DOE's Oakland site recently began thinking about what processor model it should migrate to when it outgrows the largest of HP's existing 16-bit minicomputers. Not everyone in the organization reached exactly the same conclusion, however.

Litcher's bosses proposed the idea of investigating system providers other than HP. But Litcher, a die-hard HP devotee, strongly urged the DOE to stick with its current processor supplier. At the same time, she also began formulating long-

Continued on page 73

Avon Products' expansion demands corporate MIS strategy to link units

BY ALAN ALPER
CW STAFF

NEW YORK — To MIS employees at Avon Products, Inc., the corporate motto, "Avon calling," is taking on a new meaning.

Diversification into health care services and mail-order fashion has caused Avon, once known exclusively for beauty products, to create a corporate information system. The system, currently in the prototype stage, will serve as a repository for critical corporate data — including competitive intelligence — to help managers guide the diversified consumer products firm in its sundry ventures.

"We wanted management to be able to make better informed and faster decisions," explains Rainer F. Paul, who in January 1986 was named Avon's vice-president for corporate management information services, the century-old firm's first corporate MIS executive. "What it boils down to is competitive advantage. If they get better information, faster, there must be some advantage."

After three years of planning and preparation, Avon is installing a system to handle information on finance, human resources, administration and, perhaps most important, the competitive environment. Assembling a corporate system, Avon executives reasoned, would eliminate redundant data collection, provide a clearer picture of corporate performance and help management shift from an administrative to a leadership role at the $3 billion concern.

The effort was not justified by cost savings to offset the declining revenue and profitability in recent years, Paul says. "It was time savings that was the justification," he adds.

However, the infrastructure will help Avon share data processing expertise throughout

Continued on page 73

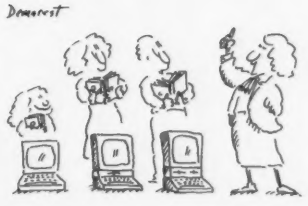
UPDATE

Creative cures for PC phobia

BY JOSH BRACKETT
SPECIAL TO CW

Many employees look forward to learning to use a personal computer with the same eagerness they might reserve for their first solo sky dive. And most training professionals are acutely aware of that fact. Only a treasured few users adopt micros with the zealousness of the Buckaroo Banzais and Indiana Joneses of today's adventure films. Indeed, most current users did not incorporate PCs into their work routines because they found them particularly exciting or easy to use. On the contrary, they learned to use microcomputers in order to become more productive, despite the sometimes humdrum learning process.

Uninspired employees who are expected to use PCs, therefore, are going to need help, especially in getting started. This is where creative micro training techniques come in. *Computerworld* surveyed PC trainers to discover the methods they use to get reticent users excited about learning to use microcomputers.



Continued on page 65

Co-op put to work

Firms attempt to keep industry talent in area

BY ALAN J. RYAN
CW STAFF

DALLAS — When companies in the Southwest found they were having a tough time filling high-technology positions, they decided to band together.

The result was the Southwest High-Technology Cooperative, a group composed of staffing managers and human-resource executives from some 40 organizations in the Dallas-Fort Worth area, including American Airlines and Electronic Data Systems Corp.

Formed in 1985, the group's aim is to keep data processing professionals, engineers and telecommunications specialists in the Southwest, an area that was losing workers to other parts of the country, according to Richard Bell, a staffing manager at accounting firm Arthur Young in Dallas.

"In reality, [cooperative members] all compete against each other for the same talent," but now they help each other at the same time, Bell says.

Cooperative members often refer prospective employees to other members. "A good candidate with some specialized experience may interview with a member company that doesn't have an immediate opening or doesn't require those particular capabilities," Bell observes. "With the applicant's permission, the recruiters can contact member firms whose needs match the individual's experi-

Continued on page 71

MANAGEMENT MEMO

Freshmen cool on programming; Bay Area turnover to rise

College freshmen's interest in computer careers has dropped, due in part to end-user computing and the computer industry slump, according to an annual survey by the University of California at Los Angeles and the American Council on Education.

The percentage of freshmen interested in a career as a programmer or systems analyst last year was 3.5%, down from 4.4% in 1985 and a peak of 8.8% in 1982, according to a survey of 290,000 students from 552 colleges.

More students realize they can use computers without being a programmer or analyst, while others are wary of the industry downturn, according to Kenneth C. Green, associate director of the university's Higher Education Research Institute.

"They also know computer science is one of the most difficult programs because they've had some exposure [to it]," Green said.

The results suggest a shortage of highly skilled computer professionals in three or four years, he predicted.

■

San Francisco-area employers feel their low rate of data processing staff turnover will catch up with East Coast rates, according to a consulting firm.

A turnover rate of 7% to 8% for the area stems from mergers and reorganizations by some of the area's large financial institutions and retailers, as well as the weak Silicon Valley economy, according to Edward Perlin Associates, Inc. in New York.

Employers who took part in a roundtable discussion held by Perlin Associates say they believe the rate will climb back to the 16% to 17% level of the Boston and New York areas as the local economy stabilizes, the firm reported.

■

Fortune 500 companies' spending for computers this year will pick up from 1986, although spending on mainframes will show little or no growth, according to a survey.

More than 45% of the 60 Fortune 500 firms surveyed plan to increase spending on computers this year, according to the Sierra Group in Tempe, Ariz.

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MANAGERS ON THE MOVE

Frederick H. Hudoff has been appointed president of **Martin Marietta Data Systems, Inc.**, a division of Martin Marietta Corp., in Greenbelt, Md. Previously, Hudoff, 54, was the company's vice-president in charge of the air-traffic control division, where he oversaw a contract for integration of the Federal Aviation Administration's air-traffic control system.

Hudoff succeeds **Patrick J. Zilvitis**, who has resigned to pursue other interests, the company said.

Brian N. Etheridge, 46, former deputy program manager and technical director of the air-traffic control organization, will replace Hudoff as the vice-president in charge of the division.

■

Hoffman-La Roche, Inc. of Nutley, N.J., has appointed **William S. Passas** director of information systems, with responsibility for expanding and upgrading the company's data processing system.

Prior to joining the company, Passas was vice-president of AFIA Information Systems.

■

Gesco Corp. of Fresno, Calif., a provider of financial information processing services to savings institutions, has appointed **Leyden L. Hahn** executive vice-president of systems development.

Hahn will oversee Gesco's systems development and applications enhancement, including development of an integrated systems architecture. Previously, Hahn served with the company as first vice-president of systems development and worked for Baldwin Data Services and Adolph Coors Co.

■

Contel Corp. has appointed **Dale M. Cunningham** to the new position of vice-president, information technology integration.

Cunningham, who reports to **Ken Bottonari**, vice-president, management information systems, is responsible for evaluating the company's information technology requirements and designing a system to satisfy them.

He came to Contel, a provider of telecommunications and information processing products and services, from Harris Corp., where he was director of telecommunications and applications, corporate information management.

■

Independence Information Systems, a subsidiary of Independence Bancorp in Perkasie, Pa., has named **Patricia L. Bleasdale** administrative vice-president and director of management information systems. Bleasdale was systems manager at Norwich-Eaton Pharmaceuticals, a subsidiary of Proctor & Gamble Co.

■

Jack Williams has been appointed director of corporate management information systems at **Electronic Associates, Inc.** in West Long Branch, N.J. Williams, originally a systems programmer at the company, previously served as its manager of systems administration and operations.

■

Roy A. Felty has been named director of management information systems by **Datamedia Corp.** in Nashua, N.H. Prior to joining Datamedia, Felty served as director of MIS and telecommunications at Popular Services, Inc. in Garfield, N.J., and as regional MIS director for the former Sperry Corp. in London.

■

GTE Electrical Products of Danvers, Mass., has appointed **John E. Jones** manager of human-resource data systems. Jones, who started at the company as a programmer analyst, previously served as supervisor of the data processing information center.

■

Larry Buresh has been named vice-president of information services at **Frank's Nursery & Crafts, Inc.** in Detroit. Formerly, Buresh served as vice-president of information systems at Ben Franklin Stores.

■

David P. Weber has been appointed manager of the Computing Services Department at the U.S. Department of Energy's **Argonne National Laboratory**. Previously, Weber served as manager of the Accident Analysis Section of the Reactor Analysis and Safety Division at Argonne.

■

Gregory S. Staszko has been named a partner in management advisory services of **Deloitte Haskins & Sells** in Cincinnati. Staszko was formerly a director of systems implementation services for KMG Main Hurdman.

Booz, Allen & Hamilton, Inc. in Chicago has named **James M. Stierwalt** a vice-president. Stierwalt is leading a multimillion-dollar effort by the Chicago-based Railroad Retirement Board to design a retirement claims processing system.

■

Zurich Insurance Co.'s U.S. branch, based in Schaumburg, Ill., has promoted **Ken Palese**, former manager of the development and education center, to assistant vice-president and director of data services support.

The company also named **Terry H. Towle**, who was previously a business systems analyst, as assistant manager of the data service commercial policy processing area.

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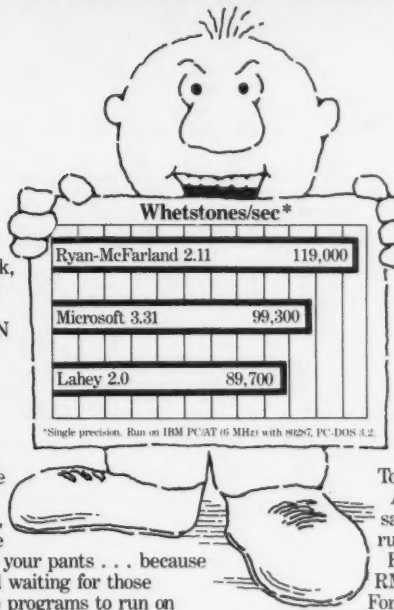
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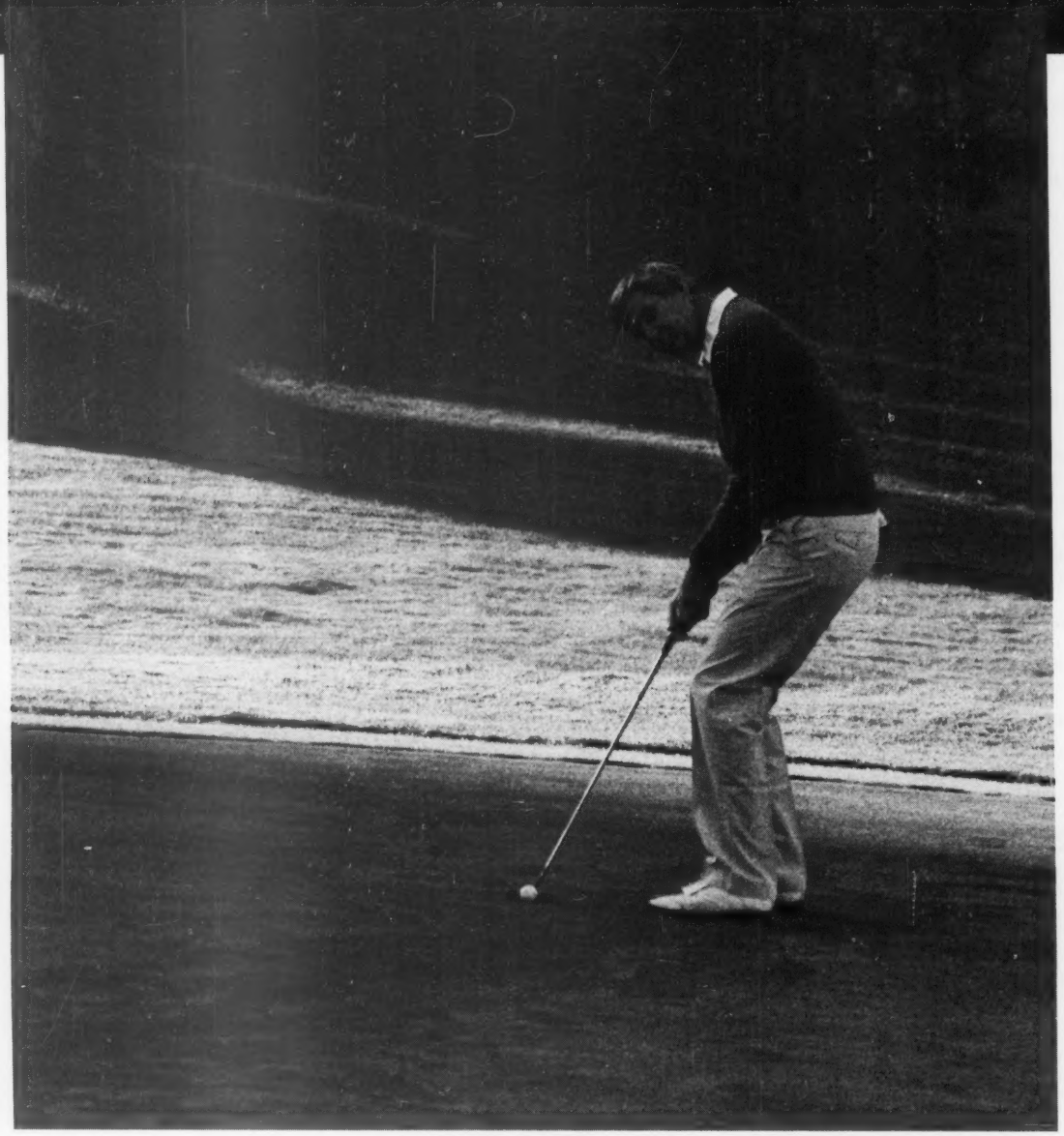

Bob Ashworth
VP General Manager
Information Technologies Division
McKesson Corporation
Age: 44
Budget: $65 million
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Bob started with McKesson, the world's largest distributor of pharmaceutical products, as a project manager in applications development. His biggest single responsibility: the implementation of McKesson's proprietary Economost micro-based inventory/ordering system for druggists, which has often been credited with the company's fast rise to leadership in the highly competitive pharmaceutical distribution industry. With Economost running smoothly, Bob's attention is primarily devoted to serving the corporation at large. That means providing decision support for those who need it, guiding the company in its acquisition of PCs (600 to date), and assessing the potential applications and value of a corporate LAN.

In his spare time, Bob's an avid golfer, a snow skier, water skier and a jogger.

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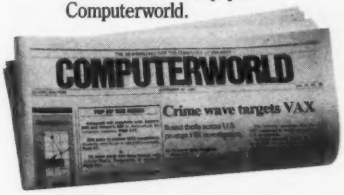

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Creative

FROM PAGE 61

Although there is no standard taxonomy, most trainers sort microcomputer learners into three broad categories:

- Beginners, many of whom have never touched a computer. This category often includes executives, who are usually more interested in the PC's role in their organizations than in putting their own hands on keyboards.
- Intermediates, who have learned one or more of the popular word processing, spreadsheet, data base or graphics software packages and perhaps something about the disk operating system.
- Advanced students, who are working independently at a near-professional level on large, complex applicatons.

Each group requires a different training approach. Most trainers agree that PC instruction is a cumulative process, with beginners requiring more human interaction and refined technique than intermediate students. And, as the intermediates advance, these users determine what they need to know and learn to teach themselves, eventually requiring only a minimal amount of instructor interaction.

Starting out

Beginners often face their first PC semiparalyzed with fear and embarrassed by their lack of technical savvy. In this situation, they need, more than anything else, patient guidance.

One trainer fighting the fear battle is Al Kirkpatrick of Southern Company Services, Inc. in Atlanta. He manages DP training for the energy holding company, which employs 31,000. "We do everything we can to make PC training a little more fun and a little more human," Kirkpatrick says. "We try to personalize it. We have computer fairs, open houses in the information center and serve popcorn, and we even let them bring their Cokes into the room." To Kirkpatrick, these tactics encourage users to relax and not be so awed by the technology.

The human touch is valuable, agrees Betty Corbin of Seidman & Seidman, a public accounting firm in Houston. She manages the PC training the firm provides for its clients. "At the beginning of class, I think it's important to spend a little while on introductions to find out where people stand and what they want to do with the PC," she says. Not only is this information useful in gauging students' needs, Corbin says, but it also helps the students assess their own needs, often for the first time.

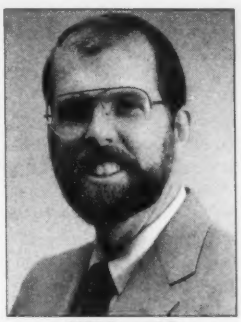
Corbin tells of a student in one Ashton-Tate Dbase class who claimed, "I don't know anything about this computer, I took the intro class a year ago, I can't remember where anything is, and I think I'm going to take early retirement on Friday." He did.

To dispel the defensive attitudes and downright fear some of her users feel toward the personal computer, Margaret Luellen of Computer Literacy Workshops, a training company in Bellaire, Texas, gives beginners a brief look at the insides of a computer. "They're happy to see that a disk drive looks like a stereo turntable," she says.

Robin Grumman, who supervises micro training at Chase Manhattan Bank, N.A. in New York, goes even further to put beginners at ease. In her department's classes, people who have never touched a computer pick up a screwdriver and disassemble one to find the chip. "Sometimes we put a bag of potato chips inside the computer for them to find," she says.

To keep the class's attention when training gets under way, Grumman's trainers sometimes appoint a student as assistant instructor and have him enter commands for the instructor. "It's a very good tool for keeping the students involved because they start wondering, 'What is this guy going to do?' "

After using tricks of the trade to pique the beginner's interest, the trainer can help keep that interest alive by creating a physical environment conducive to learning. Kirkpatrick is a firm believer in a dedicated classroom designed and outfitted especially for micro training. In his class, the students face opposite walls when they are working at their keyboards and must turn 90 degrees away from the computer, toward the instructor, when he is talking to discourage students from fiddling with their keyboards.



Al Kirkpatrick

In addition to the seating setup, Kirkpatrick arranges for all student hard disks to be loaded with the same set of programs and work files so as to soothe the beginner's "I'm going to break it" jitters.

While these tools and tactics help teach students the basics, most trainers see their main task to be relating micro training as closely as possible to the learner's job.

Providing job-specific PC training is crucial to Gary Baker, manager of training and development at the Cleveland Clinic Foundation, a large hospital complex in Cleveland. Baker's trainers are collecting a library of real medical registry applications, developed by users in the same organization, to be studied by learners as models.

At Chase Manhattan Bank, Grumman sets up case-study method programs in which bankers doing similar jobs learn computing and banking concepts in the same course.

Executive beginners

A curious bird often found in the beginner flock is the executive. Most trainers will agree that this type of learner will be more comfortable in a class made up of peers than in one that might include line managers, secretaries and accountants. Indeed, micro training for managers and executives tends to be less task-oriented and more conceptual, as befits those who may not want to use a PC themselves but who need to plan for and purchase systems as well as supervise others in the PC's use.

According to Computer Literacy Workshops' Luellen, "What managers and executives want to know is that the business judgment that got them where they are today also applies to computers: 'Yes, you can understand this.' 'Yes, you can make good business decisions as you do in your own industry.' For them, it's a more theoretical approach. They get very impatient with the hands-on aspects," she says, especially those who have never learned to type.

Moving on

Once microcomputer users have learned enough to be dangerous — that is, they are eager to do more but are unsure how to proceed — training has to change to accommodate them. Luellen says these intermediate users want direct problem-solving techniques. " 'How do I do this? What's a faster way of accomplishing that?' We tend to work with people who are busy and quick learners as well. They want to get in, learn something and get out," she explains.

Intermediate-level classes often present the instructor with a difficult mix of talent and experience. Therefore, a combination of classroom training, self-study media and one-on-one consulting is ideal. Kirkpatrick calls it the Burger King approach: "Have it your way."

Self-study tools — books, videotapes and computer-based training (CBT) — are sometimes more appropriate for this type of learner than a classroom situation, especially for those people on tight schedules or in remote locations. Seidman & Seidman's Corbin and others recommend books on the popular software packages published by Que Corp. in Indianapolis, Sybex Computer Books in Berkeley, Calif., and The Cobb Group, Inc. in Louisville, Ky.

Marta DelGiudice, who supervises microcomputer training for The Prudential Insurance Company of America in Roseland, N.J., offers her students several CBT packages, including The Instructor and Professor DOS, sold by Individual Software, Inc. in Foster City, Calif., and the Do More series, published by Houghton Mifflin Co. in New York.

Also employing CBT is Ellen Hayes of the U.S. Postal Service Data Center in San Mateo, Calif., who likes IBM's program, Exploring the IBM PC. It has, she says, "graphics, sound effects, information [that is] very nicely organized." Hayes also uses the Lotus Development Corp. 1-2-3 tutorial to convey to her students the idea of a spreadsheet.

Interactive CBT videodisks

To combat the training challenge that users in remote locations create, Jane Curtis, director of field development at Massachusetts Mutual Insurance Co. in Springfield, Mass., put interactive videodisk CBT systems developed by Interactive Training Systems, Inc. in Cambridge, Mass., into 95 branch agency offices. The packages are used to train employees in sales as well as microcomputer skills.

Curtis says, "I think it's a tremendous tool. Take this Lotus 1-2-3 CBT package. When we put it out there, I had a call from one of our general agents who is not particularly comfortable with a computer but knows that he has to be. He said that he went in on a Saturday afternoon and spent a couple of hours going through the Lotus 1-2-3 training pro-

Continued on page 66

Micro training via memory-resident tools

Hard-disk personal computers, new software tools and a fresh MIS perspective on instruction make possible the birth of a new micro training tool — memory-resident job aids.

Do not confuse this aid with a traditional manual that has been typed into a system, however, because such a file would only be a long electronic memo that really was meant to stand alone on paper. Memory-resident job aids do include on-line manuals, but the concept is entirely different.

These new tools can be envisioned as an information data base wrapped around application software or resident within a personal computer's memory. Their purpose is to give users with varying expertise an easy and immediate way of answering their questions on PC use and accelerating their learning.

Gloria Gery

According to Gloria Gery, a management training consultant based in West Hartford, Conn., these new job aids "help PC users when they are in doubt or when they want to explore more of the system." Gery, who helps managers determine their best training options, compares PC-resident tools to "training wheels that the learner can lift or bring down, based on how confident he or she is."

These aids take a variety of shapes. "Some are very structured with menus and nested menus," Gery says. Others are free-form, so users must make inquiries, such as, "How do I stop printing at the end of a page?"

In this type of system, Gery says, the product is designed to scan through the items listed in the data base so that when it hits the intersection of Stop, Printing and Page End, it lists the procedure for the user — similiar to doing a literature search in a Nexis-type data base. In effect, these aids are an extension of traditional computer-based training but are embedded in the software.

While Gery has seen these systems developed independently by several user companies and vendors alike, Human Access Language (HAL), developed by GNP Development Corp. and acquired in January 1986 by Lotus Development Corp., is probably the best known example. "HAL allows you to have everything you need around [1-2-3] without being a part of the software. It is a wraparound," Gery says.

Lotus may have created HAL as a wraparound because of its large installed base, but Gery sees potential for aids that are embedded into the software package itself.

JANET FIDERIO

Creative

FROM PAGE 65

gram. He'd never used Lotus. Then he went to his computer and felt comfortable enough to begin to build a spreadsheet. Now that's with absolutely nobody else there."

Hand-holding

In addition to self-study media like CBT, Corbin advocates working individually with intermediate-level users on problems. "The idea is not to come in and do it for them," she says. "It's to come in and hold their hand while they do it, be sure they're pointed in the right direction. I think some people really slight that particular kind of function. Maybe they're shortsighted. I know lots of companies where you can call up and get someone to come and do the whole application for you, but you can't call up and get someone to come and hold your hand while *you* do it.

"It kind of does trainers good to do that kind of support because it helps you know whether your training is hitting the spot or not," Corbin continues. "Sometimes you get a little isolated from what your students want to know."

The attuned PC instructor will know an advanced student by the questions he asks. It is this user who is most likely to use his PC and software expertise to address his business needs. The trainer should be ready to help him find answers to those targeted, specific questions.

In fact, Naomi Karten, a Randolph, Mass.-based consultant to company information centers, insists that micro training move beyond packages to principles and applications. Otherwise, she says, "You end up with a lot of users who are very skilled in keyboard acrobatics but don't quite know how to approach business problems. They pull out the spreadsheet because the spreadsheet is what they know. That's the solution, no matter what the problem is. The next step beyond the product orientation is a greater emphasis on a business analysis sort of training."

The kind of training Karten favors focuses on specific issues the advanced user faces: What is the nature of the problem? Is it an application better suited to a mainframe or a micro environment? What are the data requirements? Is it something the users should do themselves? Or should it go to the central DP organization — which, of course, users usually want to stay away from if at all possible? What kind of checks and balances should the application have? How do the users test it?

Chase Manhattan Bank's Grumman presides over advanced training, helping students find answers to these questions. "I get nervous when we start to have training for the advanced user that's too much like training for my systems people," she says. "We don't want to create a lot of nerds. But what we're starting to learn is that there's a new prototype person evolving in both communities. There are some applications programmers that are moving over to end user, and there are end users who are becoming department gurus."

Not all PC users will get to the guru stage, nor should they, Grumman says. But a few will reach the point where they need a kind of training far different from that required by beginners, intermediates or even average advanced students. In fact, many PC trainers may feel that they have exhausted their resources when it comes to newly expert users. They will find, as Grumman has, that these former beginners now "know how to organize a hard disk. They know how to use Sidekick and Sideways. They know how to operate the laser-jet printer."

But trainers should not give up trying to meet the "superadvanced" user's training needs. At the very least, Grumman points out, "Our response to that need has to be very careful listening."

Brackett is a free-lance writer based in Rockport, Mass.

Tips for designing PC training classes

Trainers surveyed follow these general guidelines when instructing the beginner, intermediate and advanced personal computer user. Most stress, however, that teaching keyboard acrobatics is not the ultimate objective; users should also learn how PCs can further business goals.

Beginning students need:

- Patience, reassurance.
- Humor; the human touch.
- Hands-on experience; no textbooks.
- Classroom format.

Intermediate students need:

- One-on-one consulting.
- Direct problem-solving techniques.
- Self-study media such as computer-based training.
- Courses on specific software packages.

Advanced students need:

- Advice on fine-tuning software use.
- Explanation of little-known functions of software.
- Student-initiated instruction; find out what the user wants to learn next.

CW CHART: MITCHELL J. HAYES; ILLUSTRATIONS: CHRIS DEMAREST

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12th Annual SAS Users Group International Conference. Dallas, Feb. 8-11 — Contact: SUGI Registration, SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

Advances in Marketing Analysis: Research Applications and Decision Support Systems. Philadelphia, Feb. 8-13 — Contact: Registrar, Office of Executive Education, The Wharton School, University of Pennsylvania, 200 Vance Hall, Philadelphia, Pa. 19104. Also being held May 3-8 in Philadelphia.

Prototyping: Implementation Strategies. Ottawa, Feb. 9-10 — Contact: Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held March 16-17 in Roanoke, Va., March 23-24 in Los Angeles and April 13-14 in Grand Rapids, Mich.

Fourth and Fifth Generation Data Management Software. Boston, Feb. 9-10 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held March 2-3 in Chicago.

Developing and Using The Information Systems Architecture. Phoenix, Feb. 9-10 — Contact: The Dooley Group, Suite 109, 50 9th Ave. S., Hopkins, Minn. 55343.

Project Management Software. New York, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held March 23-25 in Chicago.

How to Design & Improve a Cost Information & Control System. Los Angeles, Feb. 9-11 — Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12983. Also being held Feb. 18-20 in Boston, Feb. 25-27 in Chicago, March 9-11 in New York, March 16-18 in Washington, D.C., and March 23-25 in Dallas.

Key Issues in Managing Information Systems. St. Petersburg, Fla., Feb. 9-12 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

International Operational Data Security Workshop. Los Angeles, Feb. 9-12 — Contact: Information Security Associates, Inc., 350 Fairfield Ave., Stamford, Conn. 06902. Also being held in Stamford, Conn.; Houston; Toronto; Orlando, Fla.; Minneapolis; Sydney, Australia, and Singapore.

Communications Networks '87. Washington, D.C., Feb. 9-12 — Contact: CW/Conference Management Group, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

A Manager's View of Expert Systems Building. Atlanta, Feb. 10-11 — Contact: Department of Continuing Education, Georgia Institute of Technology, Atlanta, Ga. 30332. Also being held April 9-10 in Atlanta.

Computer Aided Publishing '87. Washington, D.C., Feb. 10-12 — Contact: Computer Aided Publishing, Suite 200, 90 W. Montgomery Ave., Rockville, Md. 20850.

Systems Design & Integration Conference. San Jose, Calif., Feb. 10-12 — Contact: Electronic Conventions Management, 8110 Airport Blvd., Los Angeles, Calif. 90045.

Real-Time Operating Systems: A Hands-On Workshop. Feb. 10-13, Toronto — Contact: Integrated Computer Systems, P.O. Box 3614, 5800 Hannum Ave., Culver City, Calif. 90231. Also being held March 3-6 in Washington, D.C., March 17-20 in Palo Alto, Calif., March 31-April 3 in Boston and April 21-24 in Los Angeles.

Creating Box Structured Information Systems: A New Approach for Information Systems Analysis and Design. Orlando, Fla., Feb. 11-13 — Contact: Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

1987 Bank Data Security Technical Symposium. Orlando, Fla., Feb. 11-13 — Contact: Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

AM/FM International Regional Conference on Automated Mapping/Facilities Management. Orlando, Fla., Feb. 11-13 — Contact: Barbara Emery, AM/FM International, #820, 8775 E. Orchard Road, Englewood, Colo. 80111.

South Florida Data Base Users Group. Ft. Lauderdale, Fla., Feb. 12 — Contact: 4780 N. State Road 7, Ft. Lauderdale, Fla. 33319.

FEBRUARY 15-21

Electronic Imaging '87. Anaheim, Calif., Feb. 16-19 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

15th Annual Association for Computing Machinery Computer Science Conference. St. Louis, Feb. 16-19 — Contact: Department of Computer Science, University of Pittsburgh, P.O. Box 13526, Pittsburgh, Pa. 15243.

Electronic Data Interchange. Alexandria, Va., Feb. 18 — Contact: American Trucking Association Management Systems Committee, 2200 Mill Road, Alexandria, Va. Also being held April 30 in Kansas City, Mo., and May 20 in Chicago.

Resource Planning for Central File Conversion. New Orleans, Feb. 18-20 — Contact:

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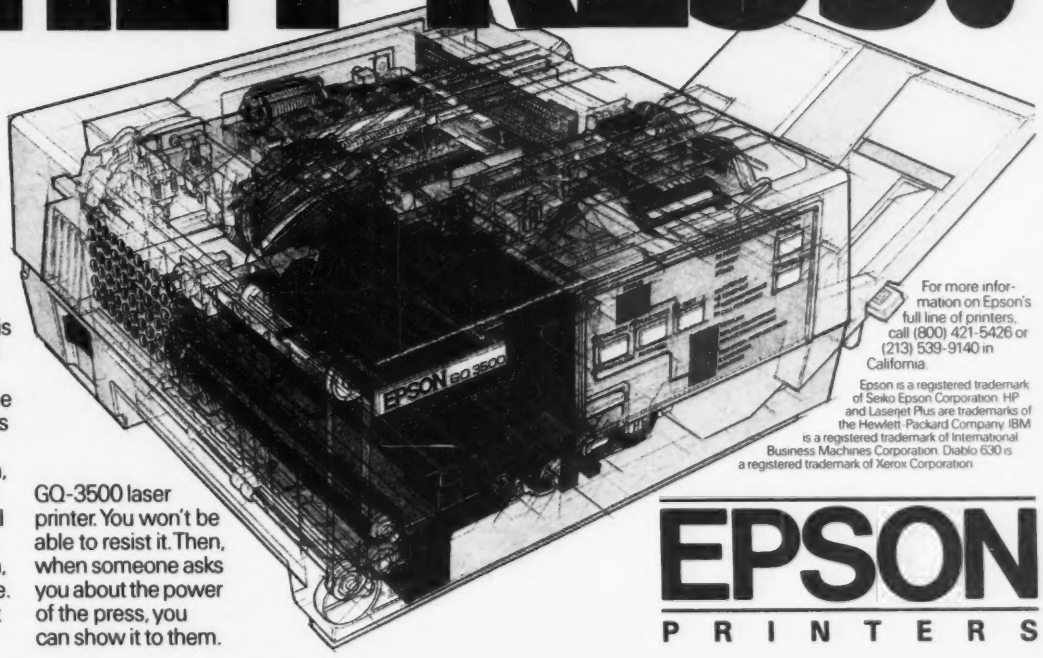

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Innovative Systems, Inc., 341 Fourth Ave., Pittsburgh, Pa. 15222.

Expo-IV (for Pick-based system users). Atlantic City, Feb. 18-20 — Contact: Expo-TMS, 22951 La Cadena, Laguna Hills, Calif. 92653.

Interactive Instruction Delivery. Kissimmee, Fla., Feb. 18-20 — Contact: Society for Applied Learning Technology, 50 Culpeper St., Warrenton, Va. 22186.

Electronic Data Interchange. Arlington, Va., Feb. 19-20 — Contact: TDCC, Suite 712, 1101 17th St. N.W., Washington, D.C. 20036. Also being held March 26-27 in Washington, D.C.

FEBRUARY 22-28

Electronic Printing Systems/Directions in Digital Imaging Conference. Miami, Feb. 22-26 — Contact: Electronic Printing Systems, Directions in Digital Imaging, Suite 1, 1855 E. Vista Way, Vista, Calif. 92084.

1987 User Group Conference. Marina del Rey, Calif., Feb. 22-25 — Contact: Trax Software, Inc., 10801 National Blvd., Los Angeles, Calif. 90064.

Automating Systems Analysis and Design. St. Paul, Minn., Feb. 23-25 — Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held in Des Moines, Iowa.; Lansing, Mich.; Austin, Texas; Toronto; and Boston.

Exchange Carriers Standards Association Technical Subcommittee T1Q1. Orlando, Fla., Feb. 23-27 — Contact: Radisson Plaza Hotel Orlando, 60 S. Ivanhoe Blvd., Orlando, Fla. 32804.

IBM: Mastering the Transition 1987-1992. New York, Feb. 24-25 — Contact: The Yankee Group, Seminar Division, 200 Portland St., Boston, Mass. 02114.

Computer Aided Software Engineering Symposium. Atlanta, Feb. 24-26 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Third Annual CHAMPS Users' Group Meeting. Crystal River, Fla., Feb. 25-27 — Contact: SCI Software, 1255 N.Van
tage Point Drive, Crystal River, Fla. 32629.

Introduction to Performance/Capacity Management. Phoenix, Feb. 25-27 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Phoenix Conference on Computers and Communications. Scottsdale, Ariz., Feb. 25-27 — Contact: Arizona State University, College of Engineering and Applied Sciences, Center for Professional Development, Tempe, Ariz. 85287.

ICIA '87/Commtex International. Atlanta, Feb. 25-28 — Contact: International Communications Industries Association, 3150 Spring St., Fairfax, Va. 22031.

MARCH 1-7

Second International Conference on CD ROM. Seattle, March 2-3 — Contact: Microsoft Corp., Box 97017, 16011 N.E. 36th Way, Redmond, Wash. 98073.

Seventh Annual Computer Operations Conference. New Orleans, March 2-5 — Contact: Association for Computer Operations Management, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

Eighth Annual Conference on EDP Performance/Capacity Management. Phoenix, March 2-6 — Contact: Applied Computer Research, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.

Corporate Electronic Publishing Systems Show and Conference. Chicago, March 3-5 — Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

DEXPO Europe '87. London, March 3-5 — Contact: Expoconsul International, 3 Independence Way, Princeton, N.J. 08540.

Securicom '87. Paris, March 4-6 — Contact: Securicom-Sedep, 8 rue de la Michodiere, 75002 Paris, France.

Data Communications Network Management. Boston, March 5-6 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held April 30-May 1 in Seattle.

Taxation of Intellectual Property. Chicago, March 5-6 — Contact: Deborah Gordon Public Relations, Inc., 320 N. Michigan Ave., Chicago, Ill. 60601.

MARCH 8-14

Spring 1987 Conference of the North American Honeywell Users Association. Charleston, S.C., March 8-13 — Contact: NAHU, Inc., P.O. Box 2037, Willingboro, N.J. 08046.

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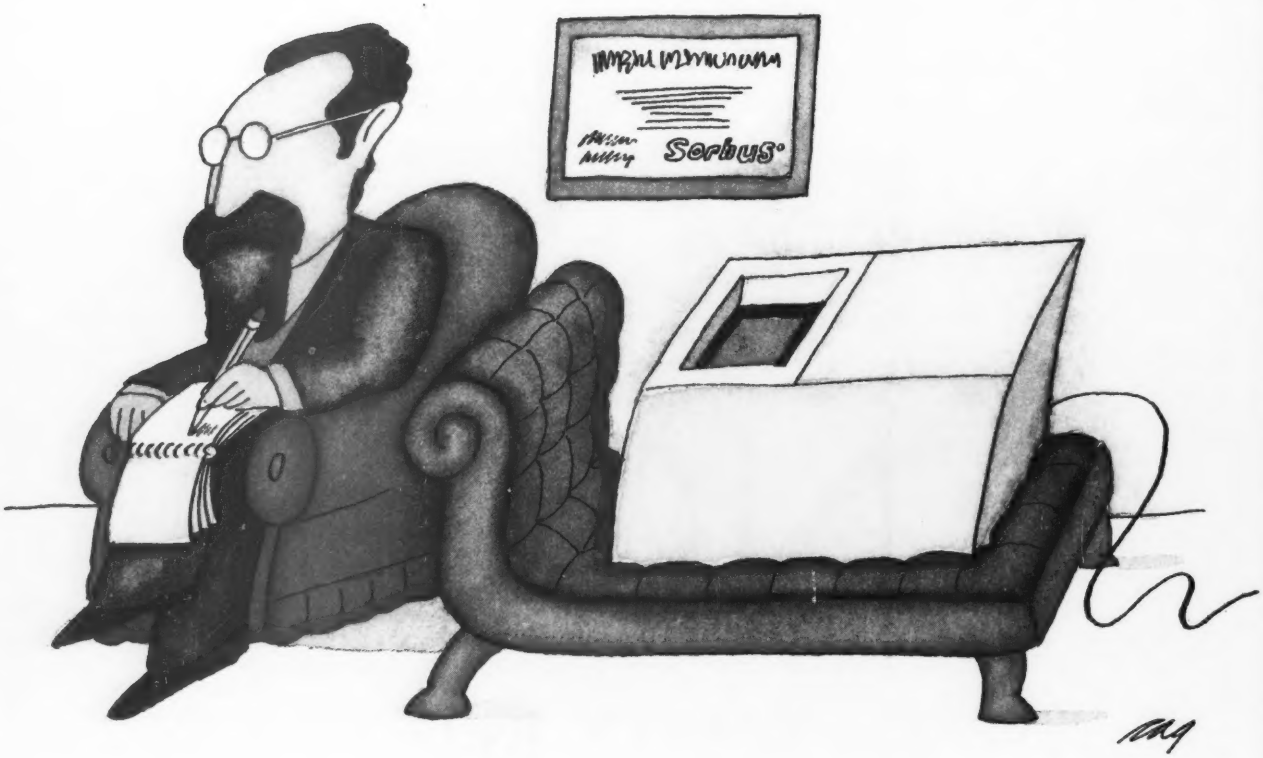

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CICS/VS Internal Structures & Control Flows. Atlanta, March 9 — Contact: American Data Group, Inc., 1770 Indian Trail Road, Norcross, Ga. 30093. Also being held May 11 in Philadelphia.

Automated Manufacturing: Computers, Communications and Controls in the Factory. St. Petersburg Beach, Fla., March 9-10 — Contact: Yvonne Chism, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

CAD/CAM, CAE Executive Workshops '87. Cambridge, Mass., March 9-10 — Contact: Cynthia Wolfram, Daratech, Inc., 16 Myrtle Ave., Cambridge, Mass. 02138.

Electronic Banking: The Challenges of Tomorrow's Bank Within Yesterday's Legal Framework. Brussels, March 9-10 — Contact: Conference Office Brussels, 19 rue de l'Orme, B-1040 Brussels.

11th Annual BRS User Meeting. Kansas City, Mo., March 9-10 — Contact: BRS Information Technologies, 1200 Route 7, Latham, N.Y. 12110.

Computer Technology and the Law: Protecting Your Rights. Arlington, Va., March 9-11 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

Federal Office Systems Expo (FOSE). Washington, D.C., March 9-12 — Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

Effective Management Skills for the MIS Manager. Cambridge, Mass., March 9-12 — Contact: American Management Association, 135 West 50th St., New York, N.Y. 10020.

Open Network Architecture: Computer III Status Report. Arlington, Va., March 10-11 — Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Corpcon East. New York, March 10-12 — Contact: Corpcon, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held April 28-30 in Chicago and Sept. 21-23 in Los Angeles.

Optical Information Systems. Long Beach, Calif., March 11-13 — Contact: Meckler Publishing, 11 Ferry Lane W., Westport, Conn. 06880.

MARCH 15-21

Software Quality Assurance. Los Angeles, March 16-17 — Contact: U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903. Also being held March 23-24 in Washington, D.C., March 30-31 in Chicago and April 6-7 in New York.

Job co-op

CONTINUED FROM PAGE 61

ence," he adds.

When workers are laid off by members of the cooperative, they are considered for open posts at other member firms.

MTech Corp., a subsidiary of MCorp. that provides data processing services to the financial industry, gets approximately one referral a week from other members of the cooperative, according to Tommy Tompkins, a company staffing specialist.

Bell says he receives and makes referrals every week, and half of the people his organization has hired in the last two years have come through the cooperative. That can benefit the company's bankroll, he says. "I know that our cost per hire has gone down drastically in the last two years," Bell notes.

The cooperative's most visible activity is its occasional Southwest High-Tech Career Fair. At one held last week at Infomart in Dallas, about 450 job candidates attended the first day and another 300 sent resumes to be distributed.

Fairs were held twice last year, at which some 25 employers met with 1,400 to 1,500 job seekers each time. About one in 14 job hunters were offered positions, and most accepted one, Bell says. Two fairs are planned this year.

The career fairs also cut employers' hiring costs, according to Kathy Bernardo, senior technical recruiter for American Airlines.

"It is extremely cost-effective," she says. "Because of the large number of candidates interviewed, we enjoy a considerable savings-per-hire vs. beating the bushes for good employees."

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The average cost per hire for MTech, through the referral service and the job fairs, amounts to about $150 to $200 per worker, Tomkins says. "It's super. If I were to run an ad that would generate any response, that would be at least an $800 ad. We're looking at more than half the cost reduction."

Bell acknowledges that, with some of the data processing professionals who were laid off by oil companies about a year ago still looking for jobs, employers face a buyer's market in the area. "There are more people in the market than openings," he says. The soft economy has also caused a slight decline in pay scales in the area and a drying up of opportunities for entry-level workers, since companies can hire experienced people for lower-level jobs, he notes.

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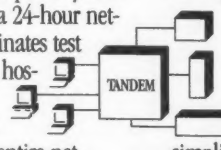

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CONTINUED FROM PAGE 61

the company and negotiate volume purchases, which will lower costs and enhance service from vendors, Paul says.

Coming at a time when many large corporations are decentralizing their data processing operations, Avon's corporate information system might seem out of step with the times.

However, Eric Knutsen, vice-president of consulting at the Gartner Group, Inc., a Stamford, Conn., market research and consulting firm, contends that better managed corporations are carefully balancing centralized with decentralized data processing. "Today, we're seeing a hybrid approach," Knutsen says. "With information technology growing in strategic importance, there is a need for a corporate group to channel the investment in proper ways."

Moreover, with the evolution of computing and communications standards such as IBM's Systems Network Architecture and Structured Query Language, a corporate MIS structure at a diversified corporation like Avon can ensure technological conformity among divisions. "That will be important 15 years down the road when data processing standards become like plumbing or electrical engineering," Knutsen says. "It will go a long way toward preventing a Tower of Babel."

Avon is creating its corporate system using twin Digital Equipment Corp. VAX 8200s in a cluster. The firm has opted to create a corporate data base using Oracle Corp.'s Oracle data base management system and is selecting a graphics and statistical analysis package.

The company hopes to eventually run some 70 applications on the system, spanning every phase of its operations, Paul says. Between 20 and 30 applications are expected to be running during the next nine to 12 months, starting with ones that use the competitive data base, he says.

"We just finished piloting the first piece — the competitive data base," Paul observes. "Over a two-year horizon, we expect to install everything; at least those things that are envisioned as of today."

Hopes for corporatewide net

Eventually, Avon hopes to create a corporatewide data network linking its three operating divisions. "Initially, the pieces will be input into the system manually, but within the next three or four months, we hope to be able to do it automatically," Paul says.

The corporate information system will be a major convenience to Avon executive John Cox, group vice-president of communications. "I once had to find out how many employees we have in Connecticut. Since Avon Beauty Products has an office in Connecticut, as does our Mediplex health care services company, there was no one place to look for that information," he recalls.

The corporate system will not only help create efficiencies but also provide Avon's executives with better decision-making tools. "It's like driving a car," Paul says. "You'd rather be steering the car by looking ahead, rather than using the rearview mirror to see what you missed."

Product delay

CONTINUED FROM PAGE 61

range plans for the eventual acquisition of a Model 930, the first commercial product of the vendor's Spectrum development project.

In continuing to advocate HP products in the face of mild management skepticism, Litcher consciously took a bit of a risk and put her professional prestige on the line. HP's solid reputation and her own extensive experience in dealing with its representatives gave her confidence in the soundness of her position.

Then, misfortune struck. Last September, HP announced, to the dismay of its user base, a six-month delay in the start of customer shipments of the long-awaited 930. The culprit, company officials said, was an unexpected problem with the system's I/O software.

Confidence unshaken

Although the postponement was disappointing, it did nothing to shake Litcher's faith in HP's competence or in the correctness of her earlier decision.

But in the eyes of her superiors, the misstep intensified doubts about HP's ability to compete in the superminicomputer sector and raised questions about the DOE's wisdom in retaining the firm as its CPU vendor.

Just as important, HP's unwelcome move somewhat damaged Litcher's hard-earned credibility with her management. Because she backed a player that later stumbled conspicuously, "the sweet faith that my boss had in my decisions has been partly eroded," she said.

'Move to a Spectrum system'

"As long as HP continues to do the job for me, I'll be faithful to them and will feel okay about my recommendation that we move eventually to a Spectrum system," Litcher said.

"But when you're looking at the issue as an outsider and not as a member of the computing profession, your perceptions may be very different" she added.

For MIS executives, the moral of Litcher's tale is simple: When vendors publicly promise to do something and then fail to deliver, the people who wind up with a black eye are often the ones who deserve it least.

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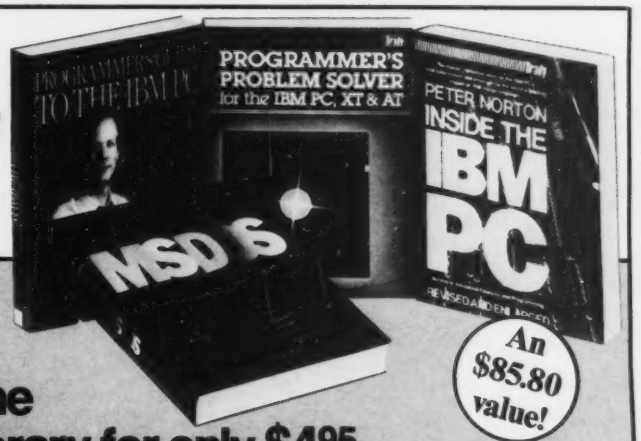

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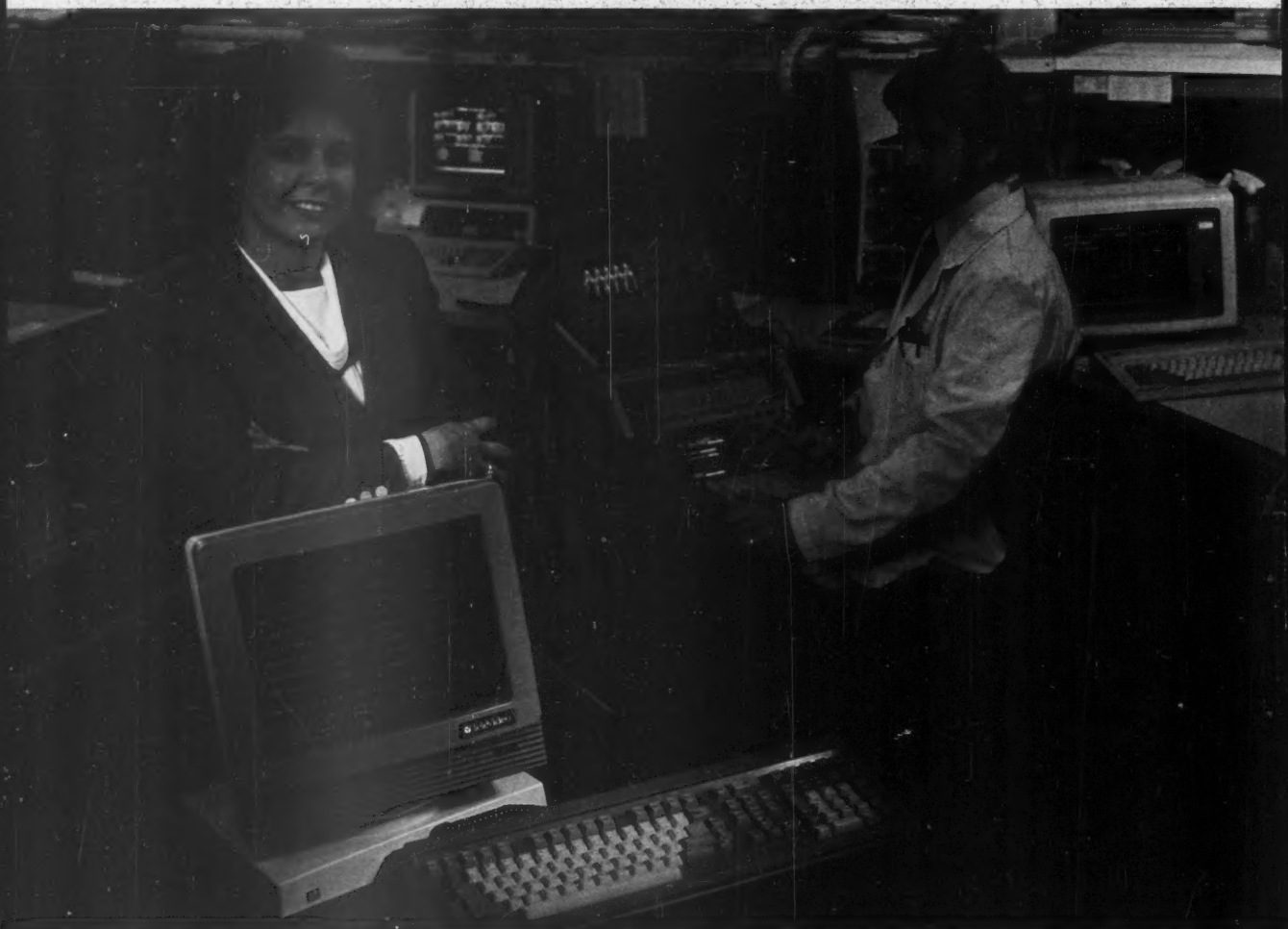

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Clinton Wilder

"Slump" no longer fits

The computer industry slump is over.

That declaration, as the industry dips its foot into 1987, is not as bold as it sounds — with an appropriate explanation. The statement is not meant to suggest that all computer vendors have seen the end of their travails that began, in most relevant cases, about two years ago. In fact, it is meant to suggest just the opposite.

Consider this a humble proposal to abolish, as of Feb. 2, the word "slump" as applied to this industry. The same goes for all of its variations — "downturn," "sluggishness," "doldrums" and the bon mot chosen by IBM Chairman John Akers in a speech to security analysts last summer — "diceyness."

Looking at the recently announced fourth-quarter results from a wide range of companies, including IBM, Wang Laboratories, Inc., Data General Corp., Prime Computer, Inc. and Altos Computer Systems, Inc., it is clear that many vendors' market problems can no longer be characterized as cyclical.

What bears this out even more is the dazzling success of so many others — the micro software Big Three, Digital Equipment Corp., Sun Microsystems, Inc. and Computer Associates International, Inc; and, in the fourth quarter, Amdahl Corp. While the industry is certainly affected by what E. F. Hutton & Co.'s Michael Geran now calls "an era of depressed demand," that phenomenon is dramatically affecting some players much more than others.

What should arouse the suspicions of every computer user and industry follower is the eerie similarity of the countless 1987 outlook opinions to their counterparts exactly one year ago. We hear constantly that IBM, and/or the industry, should see a solid pickup by the third and fourth quarters thanks to new products and the long-awaited uptick in U.S. capital spending. It

Continued on page 84

Comdisco profits dive 66%

But Cray, Apollo post strong growth rates

BY CLINTON WILDER
CW STAFF

Because of a $22.2 million loss from its risk-arbitrage activities, independent computer leasing market leader Comdisco, Inc. reported one of its worst quarters in recent years as profits dropped by 66% in the first quarter ended Dec. 31.

Pretax income from Comdisco's leasing, equipment brokering and other core businesses, however, rose 40% from year-earlier levels. Total revenue increased 8% to $238.9 million.

For the quarter, the Rosemont, Ill.-based firm reported earnings of $8 million, or 20 cents per share. In the first quarter of fiscal 1986, Comdisco earned $23.5 million, or 57 cents per share.

The expected loss from Comdisco Equities, Inc. [CW, Jan. 12], was attributed to the plunge in risk-arbitrage stocks that followed the Securities and Exchange Commission's insider trading charges against financier Ivan Boesky in November. The loss has not changed Comdisco's commitment to participate in risk arbitrage, however.

"The market disruption which resulted in a loss will, in the long term, lead to a more competitive market," Comdisco Chairman Kenneth Pontikes said. "Once the market stabilizes, Comdisco Equities will resume a strong earnings trend." He added that thus far in the second quarter, the unit's results have improved substantially.

Other major vendors reporting financial results recently included Cray Research, Inc., which continued its strong growth rates; Altos Computer Systems, Inc., which saw profits drop slightly on a modest sales increase; and Daisy Systems Corp., which continued its recent string of quarters in the red with a $4.4 million pretax operating loss.

Cray. The Minneapolis-based supercomputer leader said

Continued on page 83

Small rise in sales for Lotus

BY ALAN J. RYAN
CW STAFF

CAMBRIDGE, Mass. — Although Lotus Development Corp. reported a 14% increase in sales last week for its fourth quarter, analysts attributed much of the growth to nonoperations areas.

For its fourth quarter, ended Dec. 31, Lotus recorded sales of $81.8 million, a 14% increase from the previous year's fourth-quarter sales of $71.8 million. Income rose 37%, from $11.4 million in the like quarter in 1985 to $15.6 million. Earnings per share rose 50% from 70 cents in the fourth quarter of 1985 to $1.05 per share in the most recent quarter.

"I thought that the results indicated strong results, but I don't view them as being exceptionally strong," said analyst Tom Galvin of Shearson Lehman Bros., Inc. in New York.

Galvin said Lotus's tax rate on a year-to-year basis during the December quarter was down. He also pointed out that Lotus had a 10% reduction in shares outstanding as a result of its stock buyback program.

"While the sales increase was respectable, had they not shipped initial products of Manuscript and HAL, I figure sales would only have been up 10%," Galvin maintained. He said the 10% rate is below the average in the industry and below that of

Continued on page 83

Symantec buys firm

BY PEGGY WATT
CW STAFF

CUPERTINO, Calif. — Data base developer Symantec Corp. recently announced the acquisition of Breakthrough Software Corp., developer of Time Line Graphics and Time Line, a project management package.

Breakthrough and its 30 employees will operate as a semiautonomous divison with separate development and support teams and will still publish products under its own name at the firm's Novato, Calif., site, Symantec Chairman Vern Raburn said. Financial terms of the acquisition were not disclosed.

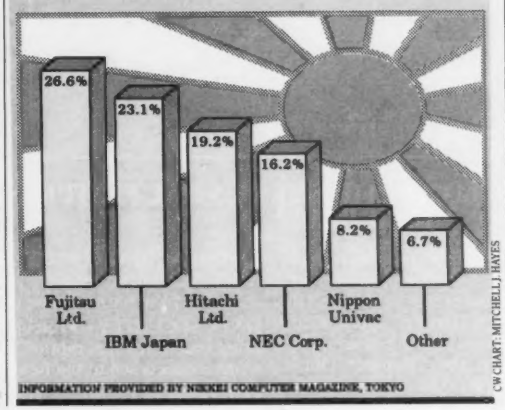
Symantec said it hopes to

Continued on page 82

Data View

Japanese computer market, 1986

IBM Japan holds a solid #2 Market share



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CW CHART: MITCHELL J. HAYES

New year brings guarded optimism for chip manufacturers

BY JAMES A. MARTIN
CW STAFF

Following the doom and gloom that the U.S. semiconductor industry has faced in recent years, a guarded optimism is beginning to emerge.

After a prolonged period in which the industry experienced large operating losses, cutbacks, layoffs and increasing competitive threats from overseas, chip manufacturers are determined to put the worst behind them, convinced that they have seen rock bottom and there is nowhere to go now but up.

In January, the Semiconductor Industry Association reported that new orders for semiconductors in the final 1986 quarter increased 8.8% and actual shipments jumped 14.7%. Analysts attributed this upturn to improvements in the microcomputer and minicomputer markets, both of which are expected to gain additional momentum this year.

"We don't believe the U.S. semiconductor industry is going to lose much more this year," says Andrew Rappaport, president of The Technology Research Group, a Boston-based industry consulting firm. "The U.S. market share declined sharply in 1985 and 1986, and by now it's lost about all it can."

U.S. vendors' worldwide market share dropped about 3.3% in 1986 from 1985, while Japan gained 2.3% and other Asian countries, 2.5%. The European market declined 1.5%, according to a study by The Technology Research Group.

U.S. share drops

In terms of U.S. dollars, the U.S. market share in 1986 was 32%, a drop from 38% in 1985, the study shows. The Japanese market totaled roughly 40%, up from 35.4%.

When corrected for exchange-rate differences, which dramatically increased with the fall of the dollar last year against the Japanese yen, the gap between the countries' market shares was not as dramatic — the U.S. had 34.4% of the 1986 market, while Japan had 37.7%.

Overall, industry growth is expected to reach about 10% this year. "It won't be much more dramatic than that, because the industry is still grappling with enough excess manufacturing capacity and a difficult pricing environment," according to Edward C. White Jr., chip analyst for E. F. Hutton & Co. "I don't see that turning around un-

Continued on page 79

User sues Zenith for faulty systems

BY ROSEMARY HAMILTON
CW STAFF

LOUISVILLE, Ky. — A user has filed suit against Zenith Data Systems, claiming that the microcomputers and a local-area network (LAN) provided by the vendor repeatedly crashed and prevented the plaintiff from doing business for a five-month period.

Capital Planning Services, Inc., a small financial services firm based here, is seeking $621,000 in damages for fraud, breach of contract and deceptive trade practices.

A spokesman for Zenith Data Systems said that the attorneys are "conducting a thorough investigation and reviewing the merits of the case" and declined further comment.

Repeated crashes

According to Beach Craigmyle, the attorney representing Capital Planning Services, the Zenith system, which included six Z-151 personal computers and a 3Com Corp. Etherseries LAN, repeatedly crashed from the time Capital Planning Services purchased it in mid-1985.

Representatives from the Zenith-owned Heath Co. computer store in Louisville, from which Capital Planning Services purchased all the equipment, were unable to solve the problems, Craigmyle said.

As a result, Capital Planning Services employees were often unable to access information needed to service their clients' accounts, he added.

Incompatibility

Craigmyle further claimed the Zenith Data Systems microcomputer was incompatible with the 3Com networking software.

In October 1985, Capital Planning Services replaced the Zenith microcomputer that had acted as the system's file server with an IBM Personal Computer XT.

There have been no further system crashes since that time, according to Craigmyle.

Ailing Phaser seeks suitor

BY JAMES A. MARTIN
CW STAFF

SAN FRANCISCO — Phaser Systems, Inc., a small micro-to-mainframe communications vendor currently reorganizing under Chapter 11 bankruptcy protection, recently confirmed that it is looking to sell all or part of the company.

"We are looking for a partnership, and we're discussing this with various companies," said John Mullen, president and the only founder still with the company.

"We're strong in research and development, but we're trying to expand our horizons, and there are many microcomputer-based data base manufacturers who need strong links to mainframe data bases to sell their products more effectively to corporate accounts," Mullen claimed.

Modest income

Phaser Systems was founded in 1980, went public in 1983 and has lost money each year since. Fiscal 1983 losses were $1.4 million; the company lost $3 million in 1984 and $1.4 million in 1985. Phaser management expects to post modest income for fiscal 1986, which ended Jan. 31.

Although Mullen would not identify any potential suitors, he pointed out the company had marketing agreements with Index Technology Corp. in Cambridge, Mass., and Micro Focus, Inc. in Palo Alto, Calif.

> "WE'RE strong in research and development, but we're trying to expand our horizons."
>
> JOHN MULLEN
> PHASER SYSTEMS, INC.

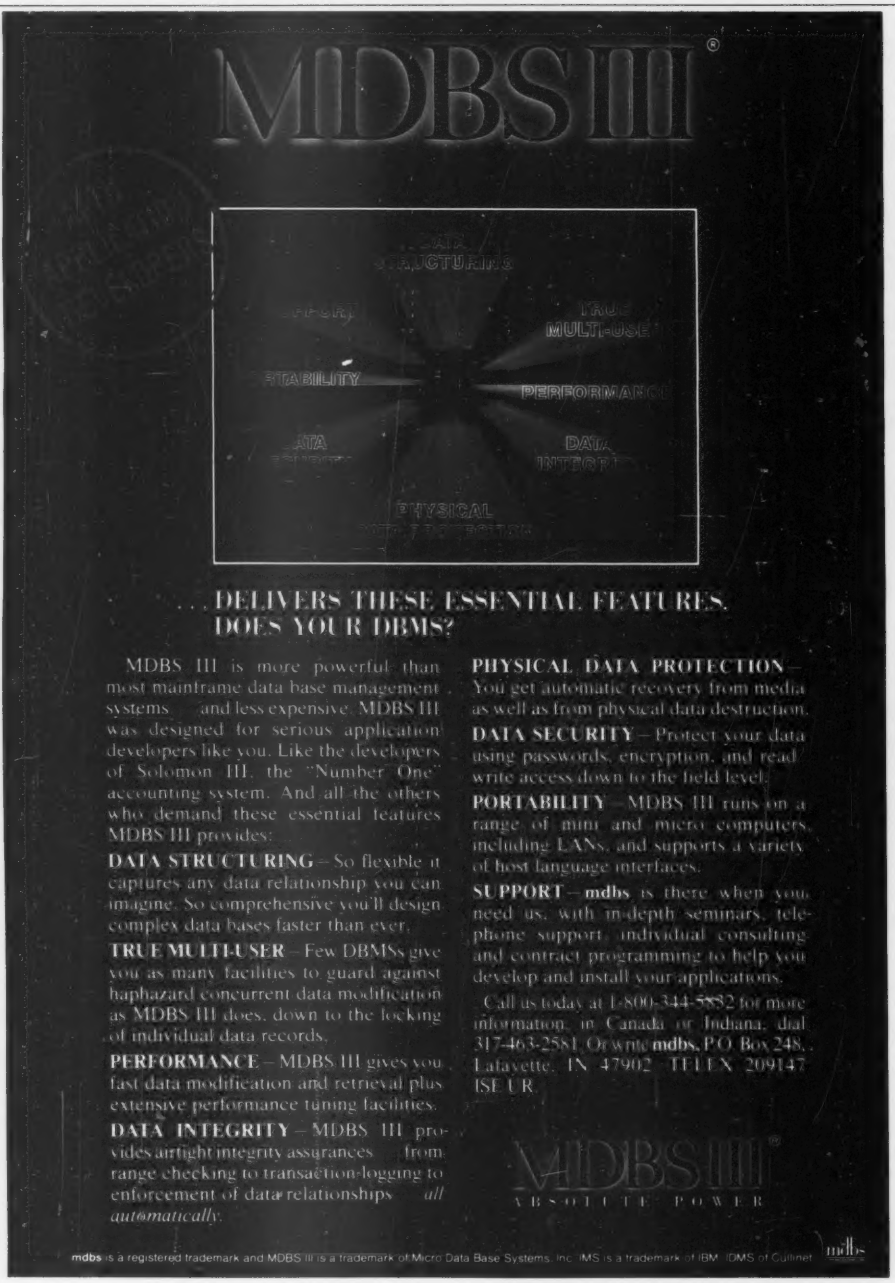
Phaser is also negotiating a joint marketing agreement with Autodesk, Inc., in Sausalito, Calif., but Mullen said the firms were not discussing an acquisition.

Phaser's micro-to-mainframe product is VDAM, which the company claims was the first link that works as an IBM mainframe VTAM application.

The competition in that area has become more heated in recent years, and Phaser might find it difficult to find a strong suitor as a result, according to Merv Adrian, chairman of the micro-to-mainframe special interest group of the New York Personal Computer Users Group.

"If I were in the market for that kind of technology, I would be looking for successful companies," Adrian said. "If they had something new or better, I can see why some companies would be interested. But as it is, they are only one of several right now offering that solution, so I can't see why anyone would spend what is probably even a bargain-basement price on that company."

VDAM has 200 installations and site licenses, including national concerns such as the U. S. Postal Service, according to Mullen. Phaser's other product, Micro/SPF, a programming tool, has sold some 20,000 copies, he added.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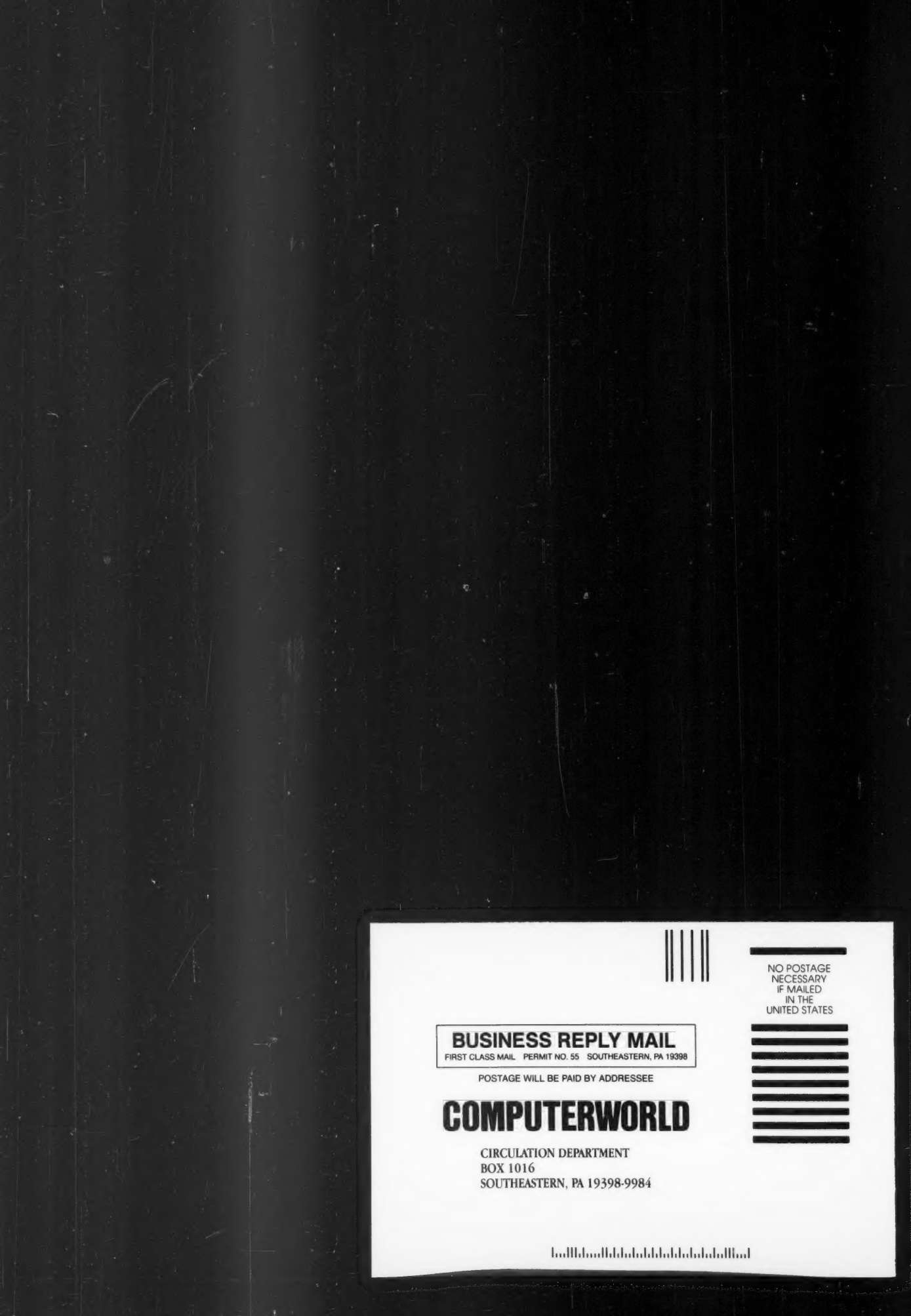
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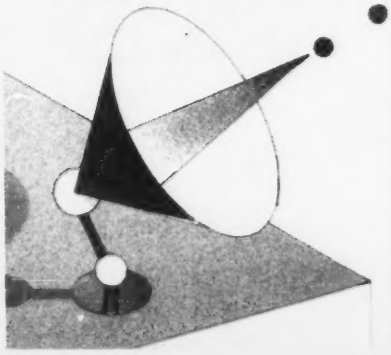

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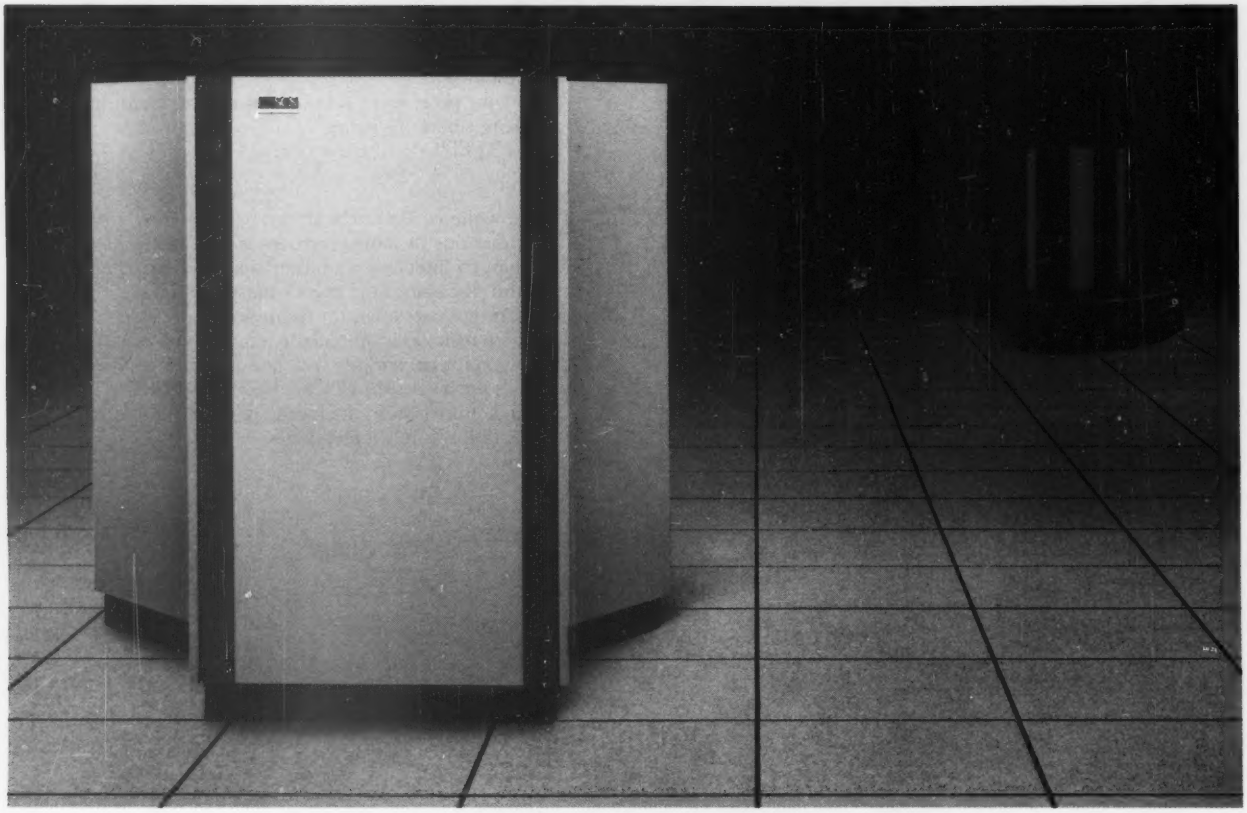

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Chips

FROM PAGE 75

til later in the year."

Despite the hope on the horizon, much talk has recently centered on the agreement between Fairchild Semiconductor Corp., Silicon Valley's first major chip company, and Japan's Fujitsu Ltd. Under the terms of the agreement, Fujitsu would gain majority control of Fairchild, which now sells mainly bipolar gate-array chip technologies for use in U.S. military weapons.

While the Department of Justice and Department of Treasury have voiced concerns that this alliance could inadvertently provide the Japanese with U.S. strategic technologies, Silicon Valley was initially worried that the merger could portend a rash of Japanese takeovers of weakened American semiconductor companies.

> "THE semiconductor industry used to be this monolithic business. Now, companies in different product areas are seeing widely different results."
>
> DREW PECK
> GARTNER SECURITIES

Last fall, closely guarded meetings held in California were attended by representatives from many U.S. chip manufacturers who discussed what options they might have to fight the Fairchild-Fujitsu liaison. No meetings have been held since, mainly because these companies found there were few realistic options at hand.

"There doesn't seem to be much action we can take, other than enforcing the antichip-dumping laws we already have," says Robert Noyce, vice-chairman of Intel Corp. "Beyond that, the damage is done, and anything else is closing the barn door after the horse is gone."

Because the U.S. government is strongly opposed to the Fairchild/Fujitsu marriage, and because most Japanese chip companies are struggling with the effects of the strong yen, it is unlikely similar mergers will occur in the near future, according to Drew Peck, semiconductor analyst for Gartner Securities, Inc.

U.S.-Japan partnerships

Instead, Peck says he believes there could be more partnerships in 1987 between American and Japanese companies similar to the Motorola, Inc./Toshiba Corp. joint-venture agreement. National Semiconductor Corp., for example, has already developed overseas partnerships with NMB Semiconductors in Japan and Thomson Semiconductors in France.

"We don't intend to go the way of Fairchild," National Semiconductor spokesman Gray Allen says. "Our approach is to work closely with other companies so we can both use our resources for maximum benefit."

"The semiconductor industry used to be this monolithic business where if the business was good, you were doing good," Peck says. "But now, there are a lot of companies in different product areas that are seeing widely different results."

Bright spots lighten chip industry's gloom

In less complicated times, the success or failure of a particular semiconductor company could be closely associated with the overall performance of the industry. No longer.

As more companies begin to tailor their chips and stay within the boundaries of niche markets, analysts are seeing more of a variety in quarterly earnings and income statements.

"Specialized companies can grow faster in the short term because of their size," says Edward C. White Jr., an analyst with E. F. Hutton & Co. "In 1987, a lot of the growth and momentum we're likely to see will come from emerging companies serving specialized niche markets."

Analysts and company officials point out that although gains were made in the second half of 1986, those improvements were not enough to compensate for losses during the first half. As a result, many chip companies reported revenue increases from the fall quarter, but only a handful could claim a rise in profits as well.

One company poised for growth this year appears to be Chips & Technologies, Inc. in Milpitas, Calif. As the inexpensive IBM Personal Computer-clone market is expected to take off this year, so is Chips & Technologies, which supplies many low-cost vendors with PC AT chip sets. The company reported net income of $3.1 million for the quarter ended Dec. 31, compared with the loss it reported a year earlier. Revenue was up 23%.

On the other hand, Intel Corp., one of the industry's most visible companies, recently reported its sixth consecutive quarterly deficit.

Although revenue was up 12% in its fourth quarter ended Dec. 27, the company posted a quarterly loss of $16.4 million and a fiscal-year deficit of $173.2 million.

With many cost-cutting moves and high hopes for its 80386 microprocessor, Intel could begin to see some turnaround this year, according to analysts.

The final 1986 quarter was a disappointment for several other chip companies as well. Advanced Micro Devices, Inc. in Sunnyvale, Calif., a very large-scale integration chip manufacturer, reported a $17.7 million net loss for its third quarter ended Dec. 28.

Although LSI Logic Corp. in Milpitas, Calif., had record revenue in its fourth quarter, net income was down 55% from the same quarter of 1985 and down 62% for the fiscal year.

In addition, Monolithic Memories, Inc. in Santa Clara, Calif., experienced a 21% increase in revenue at year's end, but it was not enough to offset earlier losses. Monolithic posted a net income of $1.3 million for its first 1987 quarter, but it was entirely attributed to a tax credit. Likewise, Cypress Semiconductor Corp. reported a net income of $3.9 million, roughly half of which resulted from an extraordinary tax credit.

There was better news to be heard from some other larger semiconductor companies. Texas Instruments, Inc. returned to profitability in fiscal 1986, citing cost reductions in data systems and semiconductor groups as the main factor.

Motorola, Inc. said it had record sales and earnings in 1986, chiefly as a result of its semiconductor sector. Sales increased 9%, new orders were up 42% and a product backlog was 3% lower than the previous fiscal year, the company stated.

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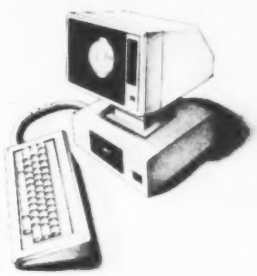

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STC continues profitability, settles three-year SEC probe

BY ALAN ALPER
CW STAFF

NEW YORK — Storage Technology Corp. (STC) reported its fifth consecutive profitable quarter last week and announced the settlement of a 3-year-old Securities and Exchange Commission (SEC) probe into its accounting practices.

Financial analysts have been fairly pleased by the firm's return to profitability and healthy order rates in 1986. STC's net earnings have benefited from interest income and the removal of commitments to service its debt while under Chapter 11 protection, according to one analyst who asked not to be identified.

The SEC settled a lawsuit that charged STC with accounting irregularities from 1982 through 1985. Under a consent decree signed last week, STC neither confirmed nor denied any wrongdoing but resolved a lawsuit filed earlier last week as a technicality in U.S. District Court for the District of Columbia. The lawsuit filing and its settlement were announced simultaneously.

In its complaint, the SEC also charged STC with overstating revenue and net income in certain periods from 1982 to 1985. In particular, STC is said to have accounted for a major transaction completed in the third quarter of 1983 as revenue in the previous quarter. In addition, the SEC maintained STC did not keep accurate books or maintain appropriate internal accounting controls from 1982 through 1984.

'Mop-up phase'

In an interview last week, STC Chairman Ryal R. Poppa said STC is entering "the mop-up phase" of its emergence from Chapter 11 bankruptcy protection. He said that within 45 to 60 days, the firm expects to resolve pending suits filed by shareholders and technology partners, negotiate a settlement with the Internal Revenue Service regarding past tax liability [CW, Jan. 12] and negotiate a $50 million line of credit.

Poppa said the firm expects to remain profitable throughout this year.

STC's earnings for the fourth quarter were $8.3 million, or 24 cents a share, on revenue of $184.3 million. One year earlier, the firm posted profits of $2.2 million, or 6 cents a share, on revenue of $168.6 million.

For the year, STC earned $36.2 million, or $1.03 a share, on revenue of $696 million. In 1985, the IBM-compatible disk drive maker lost $57.4 million on revenue of $673 million.

Paradyne cuts spending, jobs

BY JAMES A. MARTIN
CW STAFF

LARGO, Fla. — Two months after a similar move, Paradyne Corp. recently eliminated another 260 jobs in hopes of reducing 1987 spending by $9 million. The layoffs reduced the troubled data communications vendor's work force by about 7%.

Included in the latest round of cost-cutting measures were freezes in senior-executive compensation packages and consolidation of some job functions.

In addition, the company said it is anticipating a fourth-quarter loss when it reports results this month.

The latest staff reductions followed a year of cost-cutting measures that the company had hoped would help turn its misfortunes around. In November, Paradyne cut 280 jobs.

Last spring, Paradyne closed its Puerto Rico plant, which employed 165 workers. Paradyne also required at that time that all U.S. nonhourly employees take one unpaid furlough day each month for the rest of the year. In July 1985, 150 jobs were eliminated.

The federal trial on the longstanding charges against Paradyne for allegedly defrauding the U.S. Social Security Administration is scheduled to begin March 2 in Tampa, Fla.

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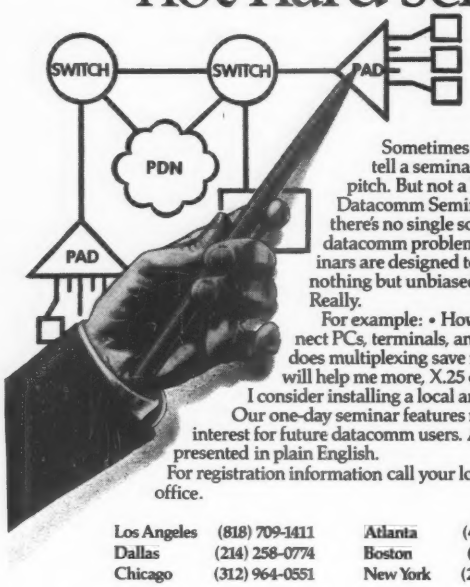

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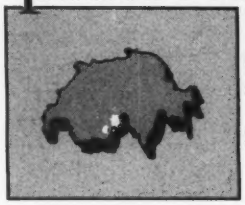

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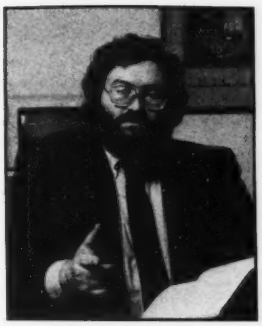

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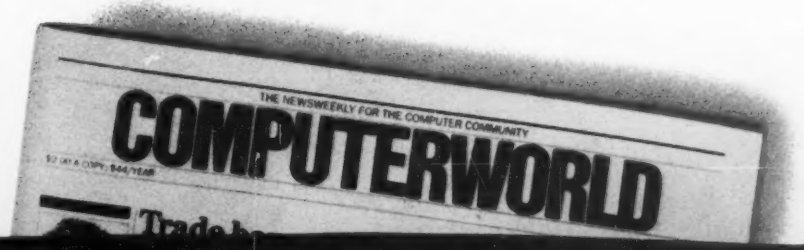


ACTIVE ISSUES

Kathy Porteus

To buy or not to buy

Explosive. Dazzling. Roaring. Frenzied.

In recent weeks, we have read such descriptions of January's stock market surge that has, among other things, sent news commentators groping for new adjectives. But for individuals still sitting on cash, each account of soaring stock prices raises the question of whether to buy now, despite such a move in the market, or wait for a correction that will produce more attractive buying opportunities.

"While we believe that stock prices of well-managed technology companies will outperform the market this year," says Bill Welty, director of research at Hambrecht & Quist, Inc., "this isn't Peter Pan and Tinker Bell. It won't be sustained just on belief."

Welty says he is a little nervous in the short term about technology issues, which in the first three weeks of the year outperformed the rest of the market by as much as 100%. Hambrecht & Quist's list of selected stocks, for example, was up almost 30% during this period.

Such nervousness is justified, according to John LeFrere of Delta Capital Management. LeFrere observes that computer industry conditions have not fundamentally improved. Therefore, he suspects many technology stocks are ahead of themselves after January's run-up in prices. "You can't tell me that this business is fabulous when IBM is coming on the news saying 'Yuk!' " he says.

Nevertheless, LeFrere still sees overlooked opportunities among technology stocks. He suggests that individuals consider medium- to low-technology stocks such as AM International, Inc. (AM — 7¼). Compared with better known high-technology firms, LeFrere says, these companies are more predictable and less susceptible to macro or emotional risks.

In the current market, LeFrere also favors investing in the most beaten-down technology stocks that trade below $1.00, such as Corvus Systems, Inc. (CRVS — 21/32). LeFrere says Corvus participates in the promising local-area network market, has sales of $60 million and still has $3 million in cash. "Corvus has no bankruptcy problems, yet there are bankruptcy situations now trading between $3.00 and $4.00," LeFrere adds.

William Easterbrook of Kidder, Peabody & Co. in San Francisco remains bullish about the rally in technology stocks. "The rally can be sustained, as indicated by the breadth of technology stocks which have moved," he says. According to Easterbrook, there may be a slight pullback in the market, but at such time he would simply buy more stocks.

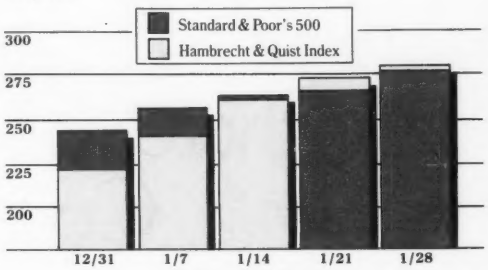
Easterbrook says he believes Wall Street's enthusiasm for technology reflects the growing conviction among investors that sometime this year there will be increased domestic demand in the computer industry. "As a result," Easterbrook says, "I wouldn't be surprised if the rally extended down to lower quality stocks."

Easterbrook favors stocks of smaller technology companies with good earnings momentum and stocks with large market capitalization that are "clearly survivors." He recommends IBM (IBM — 127¼), Unisys Corp. (UIS — 95⅞), Seagate Technology Corp. (SGAT — 27¼), Xidex Corp. (XIDX — 12½) and Micropolis Corp. (MLIS — 27¾). Other technology stocks on Kidder Peabody's recommended list include Hewlett-Packard Co. (HP — 48⅞), HBO & Co. (HBOC — 8⅝), Intel Corp. (INTC — 28⅝), LSI

Continued on page 83

High tech outpaces bull market

Hambrecht & Quist, Inc. technology index vs. Standard & Poor's Corp. 500



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Symantec

FROM PAGE 75

learn some marketing tips from Breakthrough, which has successfully reached the corporate market that Symantec's natural language data base, Q&A, has not reached, according to Raburn.

"We want to spend some time learning why Breakthrough has been successful in some areas that Q&A hasn't broken into," he said.

Symantec decided last year that an acquisition was its best way to grow. Q&A still commands only a small part of the crowded data base market, with an estimated 32,000 copies sold, according to Raburn. Adding Breakthrough nearly doubles Symantec's size.

"We believe project management software is a very lucrative segment of the market," Raburn said. He added that he expects Q&A and Time Line to become more interactive.

"Time Line is targeted at a manager who needs to get things done, and that job is also done by people who use Q&A," said Andrew Layman, president of 3-year-old Breakthrough. The companies became acquainted when Breakthrough did some joint marketing last year with Turner Hall Publishing, a wholly owned subsidiary of Symantec.

Turner Hall is also broadening Symantec's product offerings with an agreement to publish The Spreadsheet Analyst, written by the Cambridge Software Collaborative. Synex International in Vancouver, B.C., recently bought the Cambridge Software Collaborative and brought The Spreadsheet Analyst to Turner Hall to publish. The Spreadsheet Analyst audits Lotus Development Corp.'s 1-2-3, Symphony and file-compatible spreadsheets for mathematical errors or inconsistencies.

Comdisco

FROM PAGE 75

fourth-quarter profit nearly doubled to $23.3 million, or 75 cents per share. Sales increased 63% to $138.2 million.

For the year, revenue climbed 57% to $596.7 million and profits grew 65% to $124.8 million, or $3.99 per share. Cray Chairman John Rollwagen said the company installed 35 Cray supercomputers in 1986, 29 of which were purchased. Five were leased and one was installed at Cray Research.

In 1985, the company installed 28 systems, including 23 purchases, four leases and one company installation.

Rollwagen added that 46 Crays are currently on order, more than half of which will be installed in 1987.

Altos Computer Systems. The San Jose, Calif., supermicro vendor said profits for the second quarter dipped to $2.5 million, or 18 cents a share, from $2.6 million, or 19 cents a share, in the year-earlier period. Sales increased 12% to $40.4 million.

Altos President Dave Jackson announced two executive changes during the quarter. Sam Spadafora, previously vice-president of U.S. sales at the former Burroughs Corp.'s recently divested Memorex unit, has joined Altos as vice-president of national sales. Veteran Altos executive Kapil Nanda has been named to the new position of senior vice-president, product and business development.

Apollo Computer, Inc. Significantly accelerating its gradual recovery from a losing 1985, the Chelmsford, Mass., engineering workstation firm ended 1986 with its strongest earnings performance since the second quarter of 1985.

Revenue grew by 71% to $120.9 million, while profits increased more than sevenfold from a dismal year-earlier quarter to $5.3 million, or 15 cents per share. The quarter's profits made up more than half of Apollo's 1986 net income of $9.3 million, or 27 cents per share.

Nonetheless, 1986 profits still lagged far behind the company's glory days of 1983 and 1984, when the firm earned $13.1 million and $23.9 million, respectively.

Revenue for the year increased by 33% to $391.7 million. In 1985, Apollo lost $1.5 million or, four cents per share, mainly because of a disastrous $18.5 million loss in the third quarter of that year.

Vice-President and Treasurer John Newton said the fourth-quarter growth was primarily driven by Apollo's existing customer base, although the company added 150 new accounts during the period for an approximate total of 1,900 customers.

Daisy Systems. The troubled Mountain View, Calif., maker of computer-aided design systems for the electronics industry reported a net loss of $1.3 million, or seven cents per share, for the quarter, compared with a profit of $6.3 million, or 35 cents per share, one year earlier.

Revenue dropped 31% to $25.3 million from $36.6 million in the year-earlier period.

"It is still premature to project when the company will return to profitability," Daisy President Harvey Jones said.

Nixdorf Computer Corp. The West German minicomputer maker said revenue increased by 15% in 1986. For the second straight year, Nixdorf's results were hurt by the strength of the deutsche mark, as sales increased 21% before the difference in currencies was calculated.

Nixdorf said its domestic sales in West Germany grew by 21%, while international sales, affected by the currency differential, rose only 9%.

Northern Telecom, Inc. A strong fourth quarter helped the private branch exchange and telecommunications equipment maker overcome a weak first half and end 1986 with nominal increases in sales and earnings.

In the fourth quarter, higher sales and margins on central office switches fueled a 50% rise in earnings to $125.9 million, or $1.07 per share. Revenue climbed 11% to $1.31 billion.

For the year, profits were up 5% to $286.6 million, or $2.45 per share. Sales grew 3% to $4.38 billion.

The company said its revenue in 1986 from central-office switches rose 3%, from integrated business systems and terminals 1%, and revenue from transmission declined 1%. Northern Telecom Chairman Edmund Fitzgerald said the company's goal is to restore 15% annual growth rates.

Emulex Corp. Extremely weak retail sales and write-downs associated with the peripherals vendor's decision to not focus on the retail channel drove second-quarter profits down 76% to $379,00, or three cents per share. Revenue was essentially flat at $25.6 million.

In early December, Emulex decided to retreat from retail sales of its Persyst line of IBM Personal Computer enhancement products, sales of which were running $2.5 million below plan, the company said.

Emulex took a $500,000 inventory write-down charge, as well as other one-time charges associated with the move.

1986 fourth-quarter earnings

Apollo, Storage Technology are on the rebound; Comdisco, Altos, Lotus slow down

Company	Net Income Oct.-Dec. (millions of dollars)	Percent Change from 1985	Revenue Oct.-Dec. (millions of dollars)	Percent Change from 1985
Apollo	5.3	+623	120.9	+71
Altos	2.5	−4	40.4	+12
Comdisco	8.03[1]	−66	238.9	+8
Cray Research	23.3	+94	138.2	+63
Daisy	(1.29)	—	25.4	−31
General Datacomm Industries, Inc.	1.4	−5[2]	52.3	+27
Lotus	15.6	+37	81.8	+14
Northern Telecom	125.9	+50	1,314.0	+11
Storage Technology Corp.	8.3	+273	100.5	+22
Teknowledge, Inc.	0.5[3]	+41	5.5	+73

Parentheses indicate loss
[1] Includes $22.2 million loss from subsidiary Comdisco Equities, Inc.
[2] 1985 results included $3.4 million extraordinary gain.
[3] Includes $244,000 extraordinary credit.

CW CHART

To buy

FROM PAGE 82

Logic Corp. (LLSI — 15/18) and Monolithic Memories, Inc. (MMIC — 16⅜).

However, Hambrecht & Quist's Welty recommends that latecomers to the rally wait for a correction in the market before jumping in. "There is more to come, but not right now," he says.

During 1987, according to Welty, the power behind continued stellar stock performances in technology will likely come from microprocessor-oriented companies.

As examples, he cites Apple Computer, Inc. (AAPL — 49¾), Stratus Computer, Inc. (STRA — 27¾), Lotus Development Corp. (LOTS — 63), VM Software, Inc. (VMSI — 32½), Mentor Graphics Corp. (MENT — 24¼), SHL Systemhouse (SHKIS — 16¾), Seagate and Intel.

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Lotus sales

FROM PAGE 75

other leading software companies.

Analyst Brian Mutert of Robertson, Colman & Stephens in San Francisco said the fourth-quarter sales increase was higher than his firm had estimated, but "the reason was primarily the strength in the base business." Mutert added that while Lotus's international business was extraordinarily strong, the domestic business "lacked that growth."

Lotus President and Chief Executive Officer Jim Manzi noted that international sales, including U.S. exports, grew by 70% and represented 24% of Lotus's revenue for 1986.

Lotus recorded a 25% increase in sales and a 27% increase in earnings for its fiscal year ended Dec. 31. Sales for the year were $282.9 million, compared with 1985 sales of $225.5 million. Income rose to $48.3 million in 1986.

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No more slump

CONTINUED FROM PAGE 75

sounds good, it makes logical sense and it leaves plenty of room for qualification when it doesn't pan out.

With all due apologies to George Orwell, a large host of computer executives would love to go back to 1984 and live it over again. That was the year when everyone was riding high; IBM dreamed of sales of $100 billion in the foreseeable future, and Apple Computer, Inc. still wowed them during the halftime of the Super Bowl. The National Computer Conference was a certified major event, market research firms like Future Computing, Inc. (remember them?) were going gangbusters with high growth forecasts, and everyone in the MIS world, it seemed, was buying a lot of computers.

Who could have seen what was to come? With IBM leading the way, vendors expanded capacity, built factories and added employees on the expectation that it would all continue. When signs began to emerge in early 1985 that it would not last, the industry found an explanation: It had hit a slump.

However, that word, emblazoned in bold black letters on the cover of *Business Week* in June of that year, no longer seems like the right explanation in February 1987.

Companies like Wang and Data General must still prove to customers and observers that their prolonged financial malaise is in fact an aberration, rather than a sign that each company can simply not adapt to recent changes in the marketplace. If they succeed, it will be because they develop the right products and market them effectively.

It will not be because of an upturn in capital spending; at this point, it's a good bet that such an upturn would probably flow right into the corporate coffers of DEC.

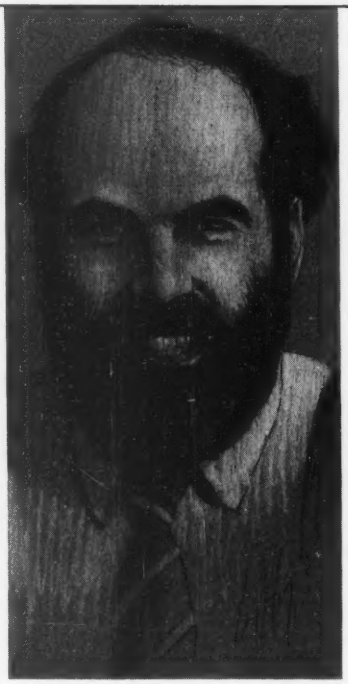
Troubles run deep

So for vendors that are still struggling, the problems run far deeper than awaiting an industry upturn. If IBM says it is hurt by decreased capital spending, could it be because a used 3081 — or a couple of VAXs — do not require as much capital as a new 3090? Once buyers get used to the idea of relatively comparable performance at a lower price, it will become hard to justify the purchase of big-ticket computers, no matter what a future boom economy does to MIS budgets.

For computer firms battling declining growth or losses, "slump" clearly is no longer the appropriate explanation. For firms that have bounced back smartly from their 1985 rock bottoms, like Apple and Apollo, a slump no longer exists.

You can choose "maturity," "shakeout," "consolidation" or many other words to describe the state of the computer industry in 1987. But from a semantic standpoint, the industry "slump" is over.

"Within 10 days we had the names of the best distributors in three foreign countries."



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In fact, selected international market information is so scarce, Land is currently writing a guide entitled the *High-Tech Exporter's Sourcebook.* And he plans to continue relying on CW International Marketing Services for distributor contacts. He explains, *"The real added value of CW is its people and expertise in-place around the world."* He adds, *"Because CW Communications is a network of international offices, CW International Marketing Services has worldwide contacts and marketing information unavailable elsewhere."*

To find out how CW International Marketing Services can work for you, call Frank Cutitta, Managing Director, at 800-343-6474 (in MA, 617-879-0700).

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NICKELS & DIMES

Ungermann-Bass, Inc. announced revenue of $32.3 million for the quarter ended Dec. 31, compared with $22.5 million in the like period a year ago.

Profits were $2 million, or 11 cents per share, compared with $1.6 million, or 10 cents per share, in the previous year.

Revenue for the year was $110.9 million, compared with $72.2 million in the previous year. Net income was approximately break-even, resulting in no earnings per share, as compared with $3.7 million, or 22 cents per share, in 1985.

Dataproducts Corp. reported net income for the third quarter ended Dec. 27 of $2.1 million, or 10 cents per share, compared with net income of $1 million, or 5 cents per share, for the like period a year ago. Revenue for the quarter was $84.4 million, compared with $90.6 million in the year-earlier period.

Comshare, Inc. reported net income for the second quarter ended Dec. 31 of $656,000, or 24 cents per share, compared with $721,000, or 25 cents per share, last year. Revenue was $17.4 million, compared with $18.2 million for the same period a year ago.

Genicom Corp. announced revenue for the fourth quarter ended Dec. 28 of $43.1 million, compared with $31.8 million one year ago. Profits were $2.5 million, or 22 cents per share, up 140% from $1 millon, or 12 cents per share, earned a year ago.

For the year, revenue was $157.5 million, compared with $126.5 million the previous year. Net income for the year was $8.6 million, or 83 cents per share, compared with $1.8 million, or 20 cents per share, reported the previous year.

Western Digital Corp. reported a record profit of $11.8 million, or 50 cents per share, for the second quarter of fiscal 1987 ended Dec. 27, a 134% increase from $5 million, or 23 cents per share, in the second quarter a year ago.

Revenue was $109.8 million, 57% higher than revenue of $70 million reported in the second quarter last year.

Massachusetts Computer Corp. announced revenue for the second quarter ended Dec. 27 of $17.2 million, compared with $13.6 million one year ago. Profits were $1.1 million, or 7 cents per share, compared with $449,000, or 3 cents per share, in the like quarter a year ago.

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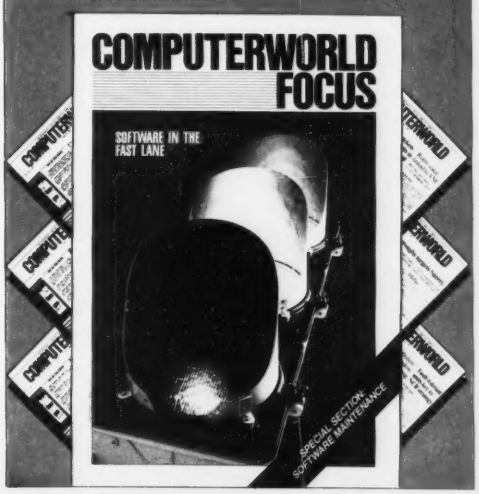

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C Developers

Senior Systems Developer (C Compiler) will work on code generation and optimization for the SAS/C™ compiler and library for IBM® mainframes. A bachelor's degree in computer science, mathematics, or a physical science is required. In-depth knowledge of the C language, IBM 370 object code, and compiler optimization techniques (both machine-independent and machine-specific) is required. Experience with compiler front-ends or mathematical programming in IBM 370 assembler language is a plus.

Senior Systems Developer (C Compiler and Library) will work on the SAS/C™ compiler and library for IBM mainframes. A bachelor's degree in computer science, mathematics, or a physical science is required. Knowledge of the C language, C library, and IBM 370 assembler language is required. In-depth knowledge of at least two of the following areas is also required: MVS or MVS/XA system, I/O and TSO interfaces, 3270 data stream, CICS, and VSAM. Experience in writing software interfaces at the assembler level, working with operating systems other than MVS and MVS/XA, and experience with language implementations on IBM mainframes is desirable.

Systems Developer will work on the Lattice® C compiler and library for 68000 architecture machines. Duties include working on enhancements to 68000 code generators, designing and writing 68000 run-time library routines in both C and assembler, and porting the compiler to additional 68000 architecture machines. Applicants must have a bachelor's degree in computer science or a related field, or equivalent experience; and three to five years' programming experience, including one year of C and one year of 68000 assembler (on any 68000 architecture machine). Knowledge of Amiga,™ Atari,™ Macintosh,™ or other 68000 operating systems is useful.

MVS

Systems Developer will develop and maintain the SAS System supervisor components for the IBM MVS environment that interfaces to communications terminals such as IBM 3278, 3279, 3287, and 3268. Applicants must have knowledge of one or more of the following: SNA protocols, the ACF/VTAM access method, 3270 data streams, MVS/XA supervisor services, or IBM 370 assembler language. Experience with developing and supporting large software systems, VTAM/NCP service aids, the C language, and the SAS System is a significant asset. A bachelor's degree in computer science or equivalent work experience is required.

Systems Developer will analyze the performance of the SAS System under MVS. Specific responsibilities include identifying any performance problem areas, suggesting ways to improve system performance, and helping implement the changes. Candidates must be able to develop a comprehensive performance management program including creating test suites for performance comparisons between releases. Knowledge of data and storage management techniques and algorithms is required. Applicants should have a minimum of three years' systems programming experience. Technical proficiency in IBM 370 assembler and one other high-level language (C preferred); and a bachelor's degree (computer science preferred), or equivalent experience, are required.

CMS

Systems Developer will work in the area of performance analysis for the SAS System under CMS. Responsibilities include implementing a methodology to perform the analysis, and designing prototypes to ensure the quality and efficiency of the SAS System under CMS. Applicants must have a bachelor's degree in computer science or equivalent work experience; experience in VM/CMS performance analysis, and/or experience with large applications systems. Proficiency in IBM 370 assembler language is required. Knowledge of C, PL/I, and FORTRAN is helpful, and knowledge of SAS software is a plus. A minimum of three years' programming experience is required.

Systems Developer will design and implement the SAS System full-screen interface under CMS, and will participate in implementing the SAS I/O subsystem under CMS. Applicants must have a bachelor's degree in computer science or equivalent work experience, and a working knowledge of VM/CMS and IBM 370 assembler language. Knowledge of C, PL/I, and FORTRAN is helpful, and knowledge of SAS software is a plus. A minimum of three years' programming experience is required.

DOS/VSE

Systems Developer (IBM 370 Assembler) will be responsible for writing, maintaining, and debugging the SAS System interface code for the DOS/VSE environment, and diagnosing and fixing problems encountered when porting SAS software to the DOS/VSE environment. Applicants must have a bachelor's degree in computer science, mathematics, or a physical science, or equivalent work experience. Excellent knowledge of IBM 370 assembler language, and of system interfaces on at least one IBM mainframe operating system is required. Knowledge of at least one high-level language (C preferred) is also required. DOS/VSE experience and assembler-level debugging experience are desired.

VMS™

Systems Developer will assist in developing the SAS System on the VAX.™ Applicants must have experience in I/O interfacing, including graphics and full-screen, disk and tape drives and devices. Requirements include in-depth knowledge of VMS™ internals, working knowledge of RMS/QIO and data base internals, a minimum of three years' experience as a VMS systems programmer, and a bachelor's degree in computer science or equivalent work experience.

PRIMOS®

Systems Developer will be responsible for porting the SAS System to the Prime 50 series machine and for developing machine (host) interfaces, which include memory management interfaces, I/O interfaces (disk, tape, terminal, and other devices), and interfaces to other low level operating system functions. This person must have a bachelor's degree in computer science or equivalent work experience, and in-depth knowledge of PRIMOS internals. Knowledge of the C language and the SAS System is desired.

AOS/VS

Systems Developer will be responsible for porting the SAS System to the Data General ECLIPSE® MV series under the AOS/VS operating system and for developing machine (host) interfaces, which include memory management interfaces, I/O interfaces (disk, tape, terminal, and other devices), and interfaces to other low level operating system functions. This person must have a bachelor's degree in computer science or equivalent work experience, and in-depth knowledge of AOS/VS internals. Knowledge of the C language and the SAS System is desired.

PC DOS

Senior Systems Developer will adapt existing code, and/or write new code, to provide full-screen windowing support for a C debugger on the IBM PC, and interface debugger to selected existing windowing packages. Applicants must have a bachelor's degree, preferably in computer science or a related field; five years' programming experience with at least one year's experience in assembler language and one year's experience in IBM PC programming; and in-depth knowledge of IBM PC full-screen interfaces and windowing at the assembler language level.

Systems Support

Associate Systems Programmer will be responsible for installing, testing, distributing, maintaining, modifying, tuning, and diagnosing systems software (AEGIS and DOMAIN/IX), as well as designing and implementing software tools for Apollo computers. Applicants must have a bachelor's degree in computer science or a related field, or equivalent experience. At least one to three years' systems administration experience is required, including ACL planning and implementation, managing Network Servers (such as NETMAIN, PRSVR, SNA Gateways) and Network Diagnostics (such as PROBENET and NETSTAT). In addition, applicants must have knowledge of the Apollo architecture and operating system internals. Experience with data communications hardware and software, the UNIX® operating system, the SAS System, and C programming is a plus.

Language Processing

Associate Systems Developer will be responsible for the research and development of natural language processing and speech recognition products and their integration into the SAS System. Applicants must have a bachelor's degree in computer science or mathematical sciences and at least two years' related work experience. An advanced degree in computational linguistics or computer science is preferred. Experience with LISP and/or the C language is required, and knowledge of IBM PC assembler language and SAS software is desired.

Systems Developer will be responsible for the research and development of natural language processing and speech recognition products and their integration into the SAS System. Applicants must have an advanced degree in computer science or computational linguistics, and four years' related work experience. Technical proficiency in LISP and/or the C language is required, and a working knowledge of SAS software is desired. Experience in writing a natural language product and supporting large software systems is desired.

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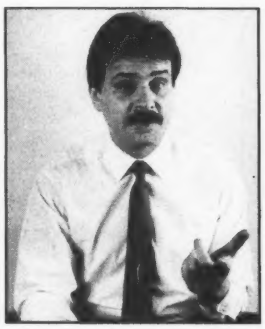

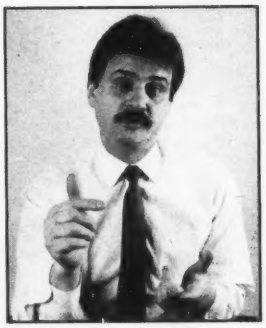

VM Personal Computing, Inc., the manufacturer of The RELAY Family™ of PC communications and micro-to-mainframe link software, was not sure whether a computer weekly or monthly would have the greatest staying (and pulling) power when it came to delivering the company's message.

"We chose Computerworld because it is read by higher-level people — those who need to know what's going on — and by very sophisticated users," explains Irv Lebovics, VMPC Vice President of Sales. *"But I have to admit that we were a little concerned about its being a weekly as opposed to a monthly. We thought that maybe Computerworld would be tossed after a week, whereas maybe the monthlies would be saved for the entire month,"* he adds.

But that clearly wasn't the case. *"As the responses started coming in, we found that we got more the second week than we got the first. This told us that Computerworld has a strong pass-along readership — and that it's active,"* says Irv.

"We were trying to get the message across about The RELAY Family to information center managers and DP managers in the Fortune 1500 arena," Irv explains. And reach they did. Their ad in Computerworld generated more leads in less time than did the leading PC weekly. And because these leads come from *qualified* prospects, Irv knows that many will turn into sales.

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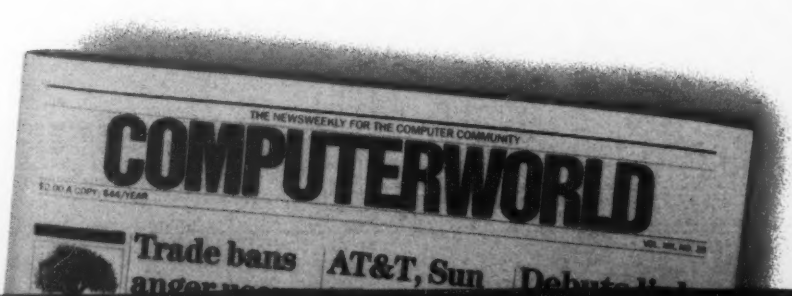

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Emulex gets injunction reprieve

BY ALAN ALPER
CW STAFF

WASHINGTON, D.C. — Emulex Corp. will, at least temporarily, resume the development and marketing of a series of products for the Digital Equipment Corp. market that it was enjoined from selling just two weeks ago.

The Costa Mesa, Calif.-based firm, which is among the largest suppliers of DEC-compatible hardware, last week got a stay of a paragraph, pending appeal, in the earlier preliminary injunction that prevented it from marketing certain products that are compatible with a DEC storage architecture. The stay was granted by the U.S. Court of Appeals. An appeal date has not been set.

The action came just two weeks after a U.S. District Court judge in Concord, N.H., upheld a preliminary injunction sought by DEC in a case involving Emulex's alleged use of misappropriated DEC technology. The disputed paragraph in the preliminary injunction prohibited Emulex from designing, developing, manufacturing and marketing any product that benefits from allegedly stolen technology [CW, Jan. 19].

While the preliminary injunction did not prevent Emulex from shipping any of its current products, the ruling did threaten to prevent the firm from shipping its new and highly touted SMDI storage subsystem later in the quarter.

"The ruling . . . means that we can once again resume the legitimate development and marketing of new products which were interrupted as a result of our compliance with the preliminary injunction," noted Emulex President Steve Frankel in a prepared statement.

The appeals court last November overturned a preliminary injuction ordered by the district court seven months earlier. A January district court ruling adopted more specific language in granting the preliminary injunction.

In its ruling last week, the appeals court said "it appears that [Emulex] will prevail with respect to the merits of its appeal because the district court order failed to comply with the mandate of this court issued Nov. 12, 1986, in which this court required the district court's reasons for entering an order beyond the reach of paragraphs one, three and four. Such reasons do not appear in the district court's decision now before us."

Reagan initiates relaxed export controls

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Reagan administration, in a major policy reversal, last week suggested it will relax the export controls on high-technology equipment, such as computers, in order to help U.S. vendors become more competitive in the world economy.

The still-sketchy proposal was mentioned by President Reagan in his State of the Union address to Congress. The message featured a plan for improving U.S. business competitiveness that includes many of the trade, export and education policies that the U.S. computer industry has long advocated.

"We think the president's proposals are in the right direction, and the administration seems very open to working with us to get more of our objectives included," said Charlotte LeGates, spokeswoman for the Computer and Business Equipment Manufacturers Association (CBEMA).

A recent report by the National Academy of Sciences said that overzealous export controls cost the U.S. economy an estimated $9.3 billion in 1985.

"For a number of years, our companies have realized that many export controls are costing us billions of dollars without really increasing U.S. national security," said Vico E. Henriques, CBEMA's president.

Reagan said he directed his Cabinet to review the export controls program and produce recommendations by early March.

He said the recommendations should be aimed at decontrolling technologies that offer no serious threat to U.S. security; eliminating unilateral controls for items that have widespread foreign availability; reducing the time necessary for obtaining an export license by at least one-third; and faster resolution of disputes about what items should be controlled.

Jim LeMunyon, senior manager of government relations for the American Electronics Association, said he is optimistic that the initiative will lead to a major overhaul of the program and a shorter list of controlled items.

"We should do a better job of controlling the things that are really critical rather than wasting our time on things that are already available around the world," LeMunyon said.

Export controls

Export controls are regulations that restrict or prohibit the export of high-technology products in order to prevent them from being used for military purposes in Soviet bloc countries.

In the past, the administration's export controls program has been dominated by the security interests of the U.S. Department of Defense.

Computer and electronics vendors are particularly upset about re-export controls that require Western customers to seek U.S. permission to resell controlled U.S. products to buyers in unapproved countries.

The vendors argue that the paperwork delays encourage foreigners to buy components and finished products from non-U.S. companies, which are not subject to re-export controls.

CBEMA officials observed that Reagan did not propose any relaxation of re-export controls, but they said the administration is willing to consider it.

Novell to buy CXI

Firm's products link micros to mainframes

BY CLINTON WILDER
CW STAFF

PROVO, Utah — Marking the trend of diversification among growing data communications vendors, Novell, Inc. last week announced its intent to acquire micro-to-mainframe link developer CXI, Inc. for approximately $32 million in Novell stock.

Privately held CXI, based in Palo Alto, Calif., makes the PCOX family of products that link IBM Personal Computers to IBM 3270 terminal networks and to the IBM System/34, 36 and 38. The buyout is the most aggressive move to date by a leading local-area network (LAN) vendor into the micro-to-mainframe market.

"Novell has plenty of cash, and it's a smart move to diversify away from LANs," said Laura Peck, a communications industry analyst with L. F. Rothschild, Unterberg Towbin. "In the long term, players in the communications market will have to offer many solutions, not just LANs."

> "NOVELL has plenty of cash, and it's a smart move to diversify away from LANs."
>
> LAURA PECK
> L. F. ROTHSCHILD, UNTERBERG TOWBIN

The announcement follows several major communications industry acquisitions within the past year, including the recent purchase of Centram Systems West, Inc. by Novell's LAN arch-rival, 3Com Corp. [CW, Jan. 26]. Other deals have included Digital Communications Associates, Inc.'s purchases of Forte Communications, Inc. and Cohesive Network, Inc.; the acquisition of Phoenix Technology, Inc. by Bridge Communications, Inc.; and Novell's buyout of Santa Clara Systems, Inc.

Novell has been selling CXI's LAN gateway products under a distribution agreement signed in the fourth quarter of 1986. CXI, which sells primarily through OEMs and distributors, currently sells its coaxial connection products through a private-label agreement with AST Research, Inc. and a marketing agreement with Zenith Data Systems.

"The Novell and CXI product lines fit like a glove; there is no overlap," said Charles Morel, CXI's founder, chairman and chief executive officer. "We believe that LAN gateways will become the connectivity option of choice for micro-to-mainframe links."

CXI, which employs 78 people, will become a wholly owned subsidiary of Novell. The acquisition, subject to board and shareholder approval, is expected to be completed by the end of this month.

Douglas Whitman, an analyst with Alex Brown & Sons, said consolidation within the data communications market will continue.

"As companies grow as rapidly as Novell has, they will need a wide variety of products," Whitman said.

HP plans spring test of first Spectrum units

BY JEFFRY BEELER
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. issued a cautiously optimistic progress report last week on its latest efforts to ready the first commercial by-product of its Spectrum development project.

Beta-test shipments for HP 3000 Model 930 will begin "probably somewhere in the April time frame," HP Executive Vice-President Dean Morton said privately, following an analysts' meeting. However, Morton was unable to name any of the beta-test candidates. The production system is scheduled to ship in the middle of the year.

HP's Young

HP President John Young deflected questions about whether the vendor has finally remedied the operating system and I/O software ills that recently delayed shipments of its 3000 Model 930 business processor.

Asked if the target date might slip again, Young downplayed the possibility but stopped short of flatly discounting it. "I don't want to speculate about events that we have no reason to believe will ever occur," he said.

Young's occasional cautiousness somewhat tempered HP's otherwise encouraging assessment of the 930's current status and near-term prospects. The vendor has compiled a list of six to 12 prospective participants in the upcoming beta-test program, Morton said in an interview.

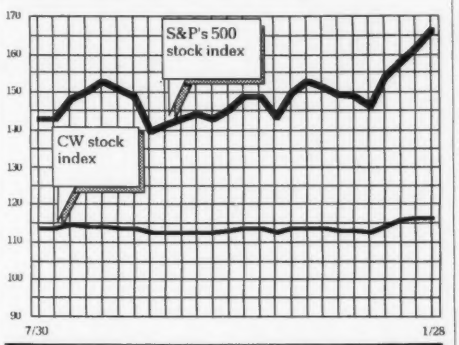
Morton also said in his prepared remarks that HP passed a major milestone in January in its attempts to fix the software bugs that forced the firm to postpone the system's first shipments last September.

But, he added a word of caution by saying that some of the 930's much-discussed woes remain unresolved. "I don't want to minimize the amount of work that remains to be done," Morton said. "As with any complex development process, it's difficult to predict results with certainty."

Expanding slightly on Morton's remarks, HP Senior Vice-President for Business Systems Doug Chance described the milestone as a recent victory in HP's longstanding battle to minimize the processor's I/O path lengths, which have contributed to the delays. "We've reduced the path lengths by two-thirds," Chance said after the meeting in response to questions.

But in correcting one design flaw, HP inadvertently introduced or uncovered some others, which the vendor is now working hard to overcome, he added. Additional development headaches also apparently lie ahead. In particular, Young said, HP still faces the time-consuming task of integrating the 930's data base management and networking facilities.

STOCK TRADING INDEX



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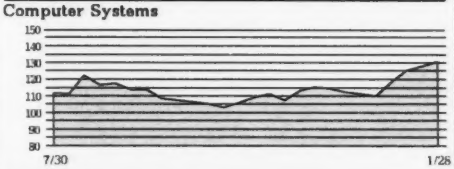
Computer Systems



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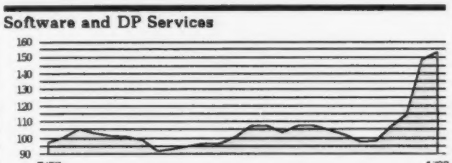

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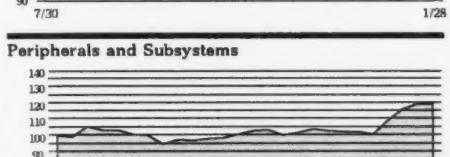

Supplies and Accessories

Semiconductors

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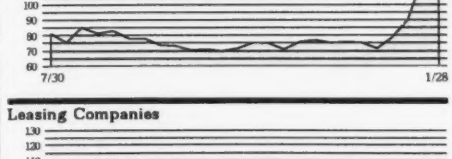

CW CHARTS: LESLIE J. MILLER

Stock trading summary

CLOSING PRICES WEDNESDAY, JANUARY 28, 1987

Computer Systems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8	4	4.88	-0.1	-2.7
O	ALTOS COMPUTER SYS	19	10	14.00	+0.0	+0.0
A	AMDAHL CORP	32	14	28.50	+0.5	+1.8
O	APOLLO COMPUTER INC	22	9	20.88	+1.5	+7.7
O	APPLE COMPUTER INC	56	22	52.75	+3.8	+7.7
N	AT&T	28	21	26.00	-0.8	-2.8
O	CPT CORP	7	3	3.63	-0.4	-9.4
N	COMPAQ COMPUTER CORP	26	12	24.88	+1.4	+5.9
A	COMPUTER CONSOLES INC	12	6	10.25	+0.6	+6.5
O	CONCURRENT COMP CORP	25	11	15.00	+0.8	+5.3
N	CONTROL DATA CORP	30	19	29.00	+1.5	+5.5
O	CONVERGENT TECH	14	4	9.00	+0.6	+7.5
N	CRAY RESH INC	116	62	115.13	+9.3	+8.7
O	DAISY SYS CORP	20	8	9.75	+0.4	+4.0
N	DATA GEN CORP	48	25	34.38	-3.9	-10.1
N	DATAPOINT CORP	9	4	5.25	+0.0	+0.0
N	DIGITAL EQUIP CORP	150	75	146.38	+6.4	+4.6
N	FLOATING POINT SYS INC	46	11	12.13	-0.1	-1.0
N	GOULD INC	31	15	18.50	-0.9	-4.5
N	HARRIS CORP	37	26	35.38	+0.4	+1.1
N	HEWLETT PACKARD CO	54	36	49.00	-3.4	-6.4
N	HONEYWELL INC	84	58	64.25	+0.8	+1.2
N	IBM	162	116	129.38	+6.6	+5.4
O	IPL SYS INC	4	1	2.25	+0.3	+12.5
N	ITT CORP	61	37	59.13	+1.4	+2.4
N	M A I COM INC	19	12	13.38	-0.1	-0.9
N	MATSUSHITA ELEC INDL LTD	136	64	124.75	-2.0	-1.6
O	MENTOR GRAPHICS CORP	26	11	25.75	+3.3	+14.4
N	NBI INC	14	8	10.25	-0.1	-1.2
N	NCR CORP	60	40	57.63	+0.9	+1.5
N	PRIME COMPUTER INC	28	16	22.38	+1.3	+5.9
O	STRATUS COMPUTER	34	17	29.25	-0.5	-1.7
O	SYMBOLICS INC	15	4	3.88	-0.4	-8.8
O	TANDEM COMPUTERS INC	59	22	57.50	+8.3	+16.8
N	TANDY CORP	50	31	48.38	+1.4	+2.9
N	TEXAS INSTRS INC	148	103	141.75	+7.4	+5.5
A	ULTIMATE CORP	35	13	24.25	+0.4	+1.6
N	UNISYS	101	58	86.00	+0.1	+0.1
A	WANG LABS INC - B	22	11	13.63	-0.3	-1.8
A	WANG LABS INC - C	22	11	13.88	+0.0	+0.0
N	XEROX CORP	72	49	67.75	+0.8	+1.1

Supplies & Accessories

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMER BUSINESS PRODS	37	23	28.13	+0.9	+3.2
N	BARRY WRIGHT CORP	25	14	16.00	-0.1	-0.8
A	DUPLEX PRODS INC	23	18	19.63	+0.6	+3.3
N	ENNIS BUSINESS FORMS INC	31	22	29.75	-0.5	-1.7
N	3M CO	140	86	131.25	+1.9	+1.4
N	MOORE LTD	28	19	23.00	+0.5	+2.2
O	STANDARD REGISTER CO	50	32	43.00	-3.5	-8.9
N	WALLACE COMPUTER SVCS	50	37	47.25	+1.3	+2.7

Software & DP Services

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	7	3	4.25	-0.3	-5.6
N	ADVANCED SYS INC	20	12	18.63	+0.0	+0.0
N	AGS COMPUTERS INC	35	17	33.25	+0.4	+1.1
N	AMERICAN MGMT SYS INC	31	12	26.50	+1.0	+3.9
O	AMERICAN SOFTWARE INC	23	9	21.00	+1.6	+8.4
N	ANACOMP INC	7	3	4.38	-0.3	-5.4
O	ANALYSTS INTL CORP	10	4	8.88	+0.0	+0.0
O	ASHTON TATE	30	10	26.25	-1.1	-4.1
O	ASK COMPUTER SYS INC	15	9	13.00	-0.1	-1.0
O	ASTRADYNE COMP IND	3	1	1.56	+0.0	+0.0
N	AUTOMATIC DATA PROC	47	29	44.50	-0.8	-1.7
N	BOOLE & BABBAGE INC	8	4	7.75	-0.3	-3.8
O	COMPUTER ASSOC INTL INC	25	17	16.50	+0.0	+0.0
O	COMPUTER HORIZONS CORP	14	10	12.88	-0.1	-1.0
O	COMPUTER NETWORK TECH	10	4	4.06	-0.5	-11.0
N	COMPUTER SCIENCES CORP	53	30	50.00	-0.5	-1.0
O	COMPUTER TASK GROUP INC	19	11	13.38	+0.6	+4.9
O	COMPUTONE SYS INC	6	0	0.19	+0.0	+0.0
O	COMSHARE INC	16	10	13.50	+1.5	+12.5
N	CULLINET SOFTWARE INC	17	6	8.25	-0.1	-1.5
O	CYCARE SYS INC	17	7	9.63	-0.1	-1.3
O	DUQUESNE SYS INC	33	15	40.50	+2.0	+5.2
N	GENERAL ELEC CO	104	69	101.00	+3.9	+4.0
N	GERBER MTRS CORP	50	24	29.88	-0.4	-1.2
O	HOGAN SYS INC	15	7	13.88	-0.6	-4.3
O	INFORMATION SCIENCES INC	4	1	1.13	-0.3	-18.2
O	INFOTRON SYS CORP	19	7	7.75	-0.3	-3.1
O	KEANE INC	16	5	6.25	+0.3	+4.2
N	LOGICON INC	38	22	27.25	-1.0	-3.5
O	LOTUS DEV CORP	69	20	65.75	+1.8	+2.7
O	MANAGEMENT SCI AMER	18	11	17.50	+0.9	+5.3
O	MCOMM CORP	13	6	6.25	-0.5	-7.4
O	MICOM SYS INC	23	10	15.75	-0.3	-1.6
O	MICRO PRO INTL CORP	4	2	3.00	-0.1	-4.0
O	MICROSOFT CORP	78	26	71.50	+3.8	+5.5
O	NATIONAL DATA CORP	26	16	23.50	+0.8	+3.3
O	ON LINE SOFTWARE INT	19	10	18.25	-0.5	-2.7
O	ORACLE SYS CORP	30	13	27.50	-0.5	-1.8
N	PANSOPHIC SYS INC	39	25	38.00	+2.3	+6.3
O	POLICY MGMT SYS CORP	30	15	29.00	+0.5	+1.8
O	PROGRAMMING & SYS INC	11	8	9.00	-0.4	-4.0
O	REYNOLDS & REYNOLDS CO	42	27	30.75	-2.0	-6.1
O	SCIENTIFIC COMPUTERS INC	7	4	7.13	-0.1	-1.7
O	SEI CORP	28	15	23.00	+1.0	+4.5
O	SHARED MED SYS CORP	49	30	44.75	-2.5	-5.3
O	SOFTWARE AG SYSTEMS INC	22	10	12.38	-0.8	-5.7
O	SOFTWARE PUBG CORP	11	5	9.50	-1.0	-9.5
A	STERLING SOFTWARE INC	21	10	12.13	-1.0	-7.6
N	SUNGUARD DATA SYSTEMS	17	10	16.50	+0.1	+0.8
N	UCCEL CORP	33	15	30.00	-0.3	-0.8
N	URS CORP	18	11	18.00	+0.1	+0.7
O	VM SOFTWARE INC	36	12	33.00	+3.5	+11.9

Semiconductors

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	34	13	17.63	+0.1	+0.7
N	ANALOG DEVICES INC	25	14	18.63	+0.3	+1.4
O	ANALOGIC CORP	15	10	10.63	0.1	-1.2
N	APPLIED MAGNETICS CORP	21	13	20.00	+0.9	+4.6
O	AVANTEK INC	23	14	15.50	-1.3	-7.5
O	HADCO CORP	6	3	4.00	-0.5	-11.1
O	INTEL CORP	32	16	29.25	+1.8	+6.4
O	MICRO MASK INC	7	2	4.50	-0.1	-2.7
N	MOTOROLA INC	50	34	45.63	+1.9	+4.3
N	NATIONAL SEMICONDUCTOR	16	8	14.00	+0.4	+2.8
N	TERADYNE INC	30	16	18.88	-1.0	-5.0

Peripherals & Subsystems

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
A	AM INTL INC	9	5	7.25	+0.0	+0.0
A	ANDERSON JACOBSON INC	3	1	1.63	-0.3	-13.3
O	AST RESH INC	28	11	15.75	+0.9	+5.9
O	AUTOTROL CORP	10	5	7.75	+1.3	+19.2
O	AVANT GARDE COMPUTING	7	3	4.75	-0.1	-2.6
O	BANCTEC INC	13	6	11.38	+0.6	+5.8
N	BOLT BERANEK & NEWMAN	51	34	48.38	0.5	-1.0
A	CETEC CORP	9	5	5.13	-0.3	-4.7
A	COGNITRONICS CORP	6	2	3.38	+0.0	+0.0
O	COMPUGRAPHIC CORP	27	16	21.50	+0.0	+0.0
N	COMPUTERVISION CORP	20	10	19.13	-1.6	+9.3
N	CONRAC CORP	18	12	14.25	+0.5	+3.6
A	DATAPRODUCTS CORP	18	11	14.38	+0.1	+0.9
A	DATARAM CORP	18	7	8.75	+0.3	+2.9
O	DATA SWITCH CORP	9	5	6.38	+0.0	+0.0
O	DATUM INC	7	4	5.75	+0.5	+9.5
N	DECISION INDS CORP	15	8	10.13	-0.3	-2.4
O	ENDATA INC	8	4	7.88	+0.4	+5.0
O	EMC CORP	25	11	23.25	-0.3	-1.1
O	EVANS & SUTHERLAND	33	20	32.00	+1.8	+5.8
N	FLOATING POINT SYS INC	46	11	12.13	-0.1	-1.0
O	GANDALF TECHNOLOGIES	9	5	9.00	+0.9	+10.8
N	GENERAL DATACOMM IND	15	8	9.50	+0.3	+2.7
N	HAZELTINE CORP	30	16	29.75	+0.0	+0.0
O	ICOT CORP	13	8	9.50	-0.5	-5.0
O	INFORMATION INTL INC	18	13	13.75	-0.5	-3.5
O	INTECOM INC	7	3	3.00	+0.0	+0.0
O	INTERLEAF INC	15	8	10.25	1.6	13.7
O	MEGADATA CORP	4	2	2.88	+0.0	+0.0
A	MSI DATA CORP	14	10	13.50	+0.6	+4.9
N	NASHUA CORP	28	16	27.13	+0.9	+3.3
O	NETWORK SYS CORP	19	10	17.38	+0.4	+2.2
N	NORTH AMERN PHILIPS CORP	48	35	41.75	2.9	6.4
N	NORTHERN TELECOM LTD	39	25	38.25	+1.0	+2.7
O	NOVELL INC	37	14	34.75	+1.5	+4.5
N	PARADYNE CORP	11	4	4.63	-0.1	-2.6
A	PENRIL CORP	9	4	4.63	+0.4	+8.8
N	PLESSEY PLC	38	22	31.38	+1.9	+6.4
O	PRINTRONIX INC	15	10	11.00	+0.4	+3.5
O	QMS INC	16	10	10.13	+0.0	+0.0
O	RAMTEK CORP	7	3	5.50	+0.0	+0.0
N	RECOGNITION EQUIP INC	20	10	18.25	-0.3	-1.4
O	SCAN TRON CORP	19	11	12.00	4.3	-26.2
N	SCIENTIFIC ATLANTA INC	15	9	13.38	+0.3	+1.9
O	SEAGATE TECHNOLOGY	30	8	28.13	0.5	1.7
N	STORAGE TECHNOLOGY	7	2	3.75	0.4	9.1
O	SUN MICROSYSTEMS INC	32	11	28.63	+0.1	+0.4
A	T-BAR INC	8	5	7.88	+0.0	+0.0
A	TAB PRODS CO	16	12	15.75	-0.3	-1.6
O	TANDON CORP	8	2	2.50	0.3	9.1
A	TEC INC	7	3	3.75	+0.3	+7.1
N	TEKTRONIX INC	40	27	39.00	37.8	49.2
O	TELEVIDEO SYS INC	4	2	2.63	-0.1	-4.5
N	TELEX CORP	85	52	82.13	+3.5	+4.5
N	TIMEPLEX INC	34	14	31.63	+0.1	+0.4
N	TITAN CORP	12	6	7.75	0.5	6.1
O	VISUAL TECHNOLOGY INC	1	0	0.44	+0.0	+0.0
O	WYSE TECH	24	11	22.63	1.0	4.2

Leasing Companies

EXCH		52-WEEK RANGE (1)		PRICE CLOSE JAN 28 1987	WEEK NET CHNGE	WEEK PCT CHNGE
N	COMDISCO INC	25	15	20.63	0.5	2.4
N	CONTINENTAL INFO SYS	12	7	9.25	0.5	5.1
O	FINALCO GROUP INC	5	2	3.25	0.4	10.3
O	PHOENIX AMERN INC	6	3	5.38	+0.0	+0.0
O	SELECTERM INC	12	5	6.00	+0.4	+7.9
N	U.S. LEASING	48	38	46.75	+2.0	+4.5

EXCH: N = NEW YORK; A = AMERICAN; P = PACIFIC; B = BOSTON; L = NATIONAL; M = MIDWEST; O = OVER-THE-COUNTER; S = SPLIT

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(1) TO NEAREST DOLLAR

Hot stock for a day

Market jumps as HP reports sales, reaching 52-week high

Investors reacted strongly last week to Hewlett-Packard, a traditional blue chip stock that has not seen that much good news in the past year.

When HP Chief Executive John Young announced last Tuesday that orders for the firm's computer products were up 14% in the last two months of 1986, HP became the New York Stock Exchange's most active issue that day with a volume of 3.9 million shares.

Although the stock rose only ⅛ on that day, it continued to climb later in the week and closed at 50⅞ on Thursday, nearing its 52-week high of 54¼. Investors are apparently encouraged by HP's reported strong rise in orders overseas, which is a critical component of HP's success.

Computer stocks experienced a broad-based decline toward the end of the week. On Thursday, IBM, DEC, Cray Research, NCR and Unisys all declined in a rare down day for the market.

Even Microsoft fell 3 points, ending Thursday at 68¾. Microsoft recently reached the dizzying height of 77½, more than triple its 52-week low of 25½.

CLINTON WILDER

Netlink unit competes with 3710

BY ELISABETH HORWITT
CW STAFF

RALEIGH, N.C. — Netlink, Inc., a small company founded by ex-IBMers, last week unveiled a Systems Network Architecture communications controller that directly competes with IBM's 3710 and which the company claimed enables users to avoid expensive upgrades to their IBM front-end processors.

Netlink's Network SNA-Hub is "the only network concentrator we know that can route multiple logical units downstream to multiple hosts," claimed Netlink Chief Executive Officer Paul Wood.

While IBM communications processors such as the 3720 and 3710 require direct mapping between host ports and downstream physical units such as a cluster controller port, the SNA-Hub performs dynamic allocation of logical circuits or user devices actively seeking to communicate with a host. This provides greater flexibility both in terminal-to-host connections and in SNA network configuration, according to Wood.

Logical routing also enables the SNA-Hub to reconfigure downstream devices without having to bring down the entire SNA network, Wood claimed. Both the SNA-Hub and 3710 isolate the downstream network from the IBM front-end processor so that devices can be moved, added or deleted without the need to take down the network in order to do a system generation, according to Netlink.

The Configurator, Netlink's menu-based network control system running on the IBM Personal Computer, enables the network manager to remotely reconfigure multiple SNA-Hubs from a central workstation.

North Carolina State University at Raleigh is evaluating the SNA-Hub as a way to extend the functionality of its 3725 front-end processor, "without having to buy a whole new increment for the 3725, which is pretty expensive on a cost/connection basis," noted Sam Averitt, the university's manager of communications and hardware. It can cost as much as $50,000 to add a new module to the front-end processor, he added.

A better alternative, Averitt suggested, is to have "a lot of connections with low utility, shared by casual users" share one existing line on the 3725 through the Hub. "As in a lot of places, our users demand high-speed links and then hardly ever use them. And one lab [3725 increment] supports only eight 19.2K bit/sec. links, total." The Hub enables a much greater number of users to access that burst of speed on an occasional basis, Averitt said.

"The 3710 can do the same thing but it's more expensive — like buying a whole new front-end processor," Averitt said. The 3710 is also "less flexible; it can't do quite the same level of connectivity as the Hub," he added.

Scheduled for availability in March, the SNA-Hub concentrates up to 15 direct, leased, multidrop or dial-up SNA/Synchronous Data Link Control lines into a single high-speed host trunk. It supports IBM's network management system, Netview. Support of X.25 and the IBM Token-Ring network will be announced later this year, Netlink said.

A basic SNA-Hub configuration with two downstream ports costs $11,225. Additional two-port cards are priced at $1,250. In comparison, the 3710 starts at $20,300.

Group charges

FROM PAGE 1

by offering to describe its need to individual operating companies at its Reston, Va., headquarters.

Phillips said that he has heard that at least two operating companies are now in the process of drafting tariffs for basic services that will be offered under ONA.

The delaying tactics stem from the operating companies' strategy of "springing their proposals for tariffs and interconnection standards on us at the last minute," Phillips declared. "It's likely that some users will find that their systems and operating environments are incompatible with the new standards; they want to make sure we have no time to respond."

"The problem is that AT&T is no longer the controllin c-tor [for the telecommunic. ions service industry]," said William Rahe, a vice-president of the enterprise networking strategies division at the Gartner Group, Inc., a Stamford, Conn.-based research group.

He added that since divestiture, local carriers have unveiled several proprietary basic services.

Another issue up for discussion at the March ONA forum is how to work with T1C1 subcommittees — bodies of customer-premise equipment (CPE) vendor and carrier representatives that develop CPE-to-carrier interface specifications. A draft proposal for data link protocols, recently completed by the T1C1.2 subcommittee, should go to ballot in April, noted William Buckley, director of technology planning at CPE vendor Verilink Corp.

Rather than wait for ONA, many companies are "working with vendors for something practical now" in terms of standardized connectivity within their own networks, one communications manager noted.

"The operating companies aren't bad guys, but they see themselves as competing with each other and with AT&T, so they are using ONA forums to further their business strategies," Buckley explained. "We just don't want them to forget the poor customer while they're making their ONA decisions."

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INSIDE LINES

Oft-predicted, yet never announced. Increased channel speeds for IBM mainframes failed to appear again last week when IBM rearranged its 3090 mainframe line. But the channel enhancements — with IBM likely to hike speeds to 4.5M byte/sec. — aren't dead. Observers say last week's announcement was oriented toward IBM's mainframe group, the Data Systems Division, while the channel enhancement is closely tied to letting IBM 3380 disk drives support higher speeds. The disk drives come out of IBM's General Products Division.

■

Lotus may catch the wave. The immensely successful VAX market may lure Lotus to DEC's product line, according to a company source who said the firm is considering porting 1-2-3 to DEC's product line. Access Technology has been very successful in that market with its 20/20 Spreadsheet package. The source also said that Lotus is considering removing copy protection from all of its products, addressing perhaps the No. 1 complaint of Lotus users.

■

It's not a laptop; it's not a desktop. It is in between. Look for Compaq Computer's announcement within two months of a machine weighing 19 lb with a flip-up Gas Plasma display, two full-height expansion slots, full-size keyboard, 20M-byte hard disk and a 5¼-in. floppy. The machine uses the Intel 80286 chip running at 8 MHz and has no battery power.

■

Notes from DOSLand. Microsoft is working on a faster version of Windows that takes up less memory and is aimed at Intel 8086/8088 machines. Microsoft officials have taken umbrage at reports that IBM will announce its own version of 286DOS that is incompatible with the versions provided to clone makers. Not to worry, according to the Microsofters. Microsoft and IBM will use the same DOS, although IBM may choose to add some proprietary communications capability to a new line of PCs. We shall see. Also expect some of your applications to run more slowly under 286DOS.

■

Vaxstar, where are you? Word of DEC's yet-to-be-announced low-end engineering workstation have surfaced again, and this week's talk concerns a mid-month introduction. According to sources, that time frame is likely because they have received invitations from DEC to a "non-disclosure meeting" on Tuesday for a discussion of the Vaxstation family. However, one invited source said he wouldn't be surprised if something much bigger than Vaxstar is discussed, because Ken Olsen is expected to be there.

■

Circuits busy in D.C. The first IBM Personal Computer AT-based X.25 switch will be announced by Amnet at the Communication Networks '87 conference in Washington, according to Paul Bell, president of New York City consulting firm The 23K Group. With the switch, Amnet will sell a software package, priced in the neighborhood of $25,000, that performs routing and network management functions. Also at the show, TRW Network Services Division will announce an Advanced Connector Unit that supports TCP/IP and an operating system based on Fusion from Network Research that reportedly provides peer-to-peer communications for a wide variety of operating systems and hosts. General Datacomm, meanwhile, will join the switch vendors with a centralized network management system, called Megaview, that has a "partially PC-based" architecture designed to interface with IBM's PC Netview interface.

■

The first shall be last? Aspen Peripherals, the upstart firm that promised an IBM 3480-compatible cartridge tape drive, controller and automatic loader by April, has lost its founder. According to President and CEO Donald Lundell, Ronald Vitullo left "to pursue other interests." The company says its products are installed at several locations and that evaluations are positive, but a source close to Aspen claimed the product is scarce and the company is "hunkering down to work on the drive and the controller."

■

Divorce anticipated. Speculation is brewing that Joseph J. Kroger, former Sperry president, will leave Unisys in March. It is believed he did not sign a new employment agreement when Burroughs acquired Sperry and may leave in early spring when his old agreement expires.

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